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LOOKS
AHEAD

System Q is the IBM operating system designed for its FS (Future System) central processors which will probably be announced in 1975 for shipment a year later [CW, May 23].

The system will also be compatible in limited form with the 370 processors being marketed today. A scaled-down version of the system will be announced in 1974 for use on the 370 line in 1975.

Recent documents released in the IBM-Telex antitrust suit outline some of the requirements System Q is expected to meet.

The following series (Pages 43, 46, 47) discusses some of the major items in this plan.

'Q' to Supplant IBM Software

By E. Drake Lundell Jr.

OF THE CW STAFF

TULSA, Okla. — The number of programming systems has grown to the point that some or all of them must be obsolete, according to secret IBM documents which further detail the firm's plans to develop System Q for the 1974-76 time period.

Although the documents were written in 1970, they give some insight into the IBM programming strategy at that time — a strategy that apparently has not changed to this day.

One of the major reasons for obsolescing the present programming systems, IBM planners said, is because "it is increasingly doubtful these systems will be able to support long-range revenue goals of the division."

To meet these needs, therefore, the planners said the Systems Development Division "must construct a new system which will completely obsolete and replace present generation systems. This system must satisfy the marketplace requirements for function, price and performance. It must provide a convenient migration path for the customer population," the documents said.

10-Year Life

In addition, they declared that the new system "must be designed to last at least a decade" and that "its cost-value relationship must substantially exceed today's return on programming investment."

IBM said it recognized it had a problem in the 1960-64 time frame when several different hardware systems competed for resources both in manpower and funds. "In addition, the proliferation of systems was fragmenting the marketplace," the planners noted.

(Continued on Page 43)

'Be Safe—Try to Break Your System'

By Marvin Smalheiser

CW WEST COAST BUREAU

LOS ANGELES — Jerry Neal Schneider feels the best way to protect a data processing system is to have some one trying to claw his way into it.

The challenge is healthy for the system, according to Schneider, who last year "clawed" his way into the Pacific Telephone and Telegraph Co. computer system to steal more than \$1 million worth of electronic equipment.

Schneider was still in college when he broke the telephone company's computerized ordering system.

He pleaded guilty to one count of grand theft, after investigators recovered more than \$100,000 worth of stolen merchandise. Other charges were dropped, including burglary and receiving stolen property.

He served 40 days of a 60-day sentence in a minimum security facility and was released on probation for three years.

Schneider, 27, now is systems consultant for EDP Security, Inc., a company he helped organize.

"The user is really in a bind now with the current state of the art," Schneider said. The best way to develop confidence in a system is to try and break it, he added, and "we feel we can break into almost any system."

Schneider recommended the following precautions to safeguard the integrity of user systems:

- Establish a positive frame of mind. "Say, 'We are going to become tighter. We are going to look, talk less and listen more.'"

- "A lot of problems are right out in the open if the company executive will look. Then he can immediately develop his own analysis. And he doesn't necessarily have to take drastic steps."

- An examination of physical security should be made to make sure there is protection for the equipment. The walls

(Continued on Page 45)

370 DOS Modified to Run on 360

370 Code Simulated, Backward-Compatible

By Don Leavitt

OF THE CW STAFF

IBM announced some time ago that DOS Release 27 would be limited to System 370 users only, but two independent sources — Itel's Data Products Group and the Computer Systems Group, said, in effect, "It ain't necessarily so."

San Francisco-based Itel has been working on modifications of DOS 26 to allow support for the 7330 disk system, Itel's version of IBM's 3330, on 360/50s and 65s. That step includes a software-driven rotational positional sensing (RPS) capability which is the key to 7330 use, Itel said.

Once the DOS 26 modifications are firm, the company expects to complete work on a coding scheme that will allow use of DOS 27 on 360s, with its IBM-designed improvements over DOS 26, but without getting caught on IBM's

use of instructions that are hardware-executable only on 370 mainframes.

Itel will do this by writing a series of 360-compatible instructions to simulate the effect of the 370 instructions, and by invoking the appropriate services whenever a program instruction exception is sensed.

Expanding Edos

The Computer Company, Richmond, Va., is pursuing the same general concept in its just-released Extended DOS (Edos) feature, which allows 360s to work with any instruction programs that include 370-type instructions. The full-blown

DOS 27-compatible version of Edos is expected to be released later this year, company spokesmen indicated.

The Edos feature is available to the entire range of 360s and so brings "370 compatibility" to machines smaller than those that can utilize Itel's 7330 and that vendor's software modifications. This might be called "backward compatibility" by some industry observers, the Edos people said, but they argued it is really a forward step for users.

It means that a 360 can be used for backup for a 370, they noted, even when (Continued on Page 2)

User, Industry Fates Hinge On Telex-IBM Case Verdict

By E. Drake Lundell Jr.

OF THE CW STAFF

TULSA, Okla. — All the testimony has been taken and within 45 days Judge A. Sherman Christensen should reach a de-

what they feel are the most important questions in the case.

After that session, Christensen has promised to hand down his ruling within 30 days, so the case will be over by the middle of July at the latest.

Arguments Outlined

In its closing statements, Telex will probably argue that the independent pe-

There is a new data entry family on IBM's drawing board. Story on Page 51.

ripherals market is indeed a separate segment of the computer industry and should be treated as such by the judge.

(Continued on Page 2)

Analysis

cision in the \$1.2 billion antitrust suit brought by Telex against IBM.

That decision, even though it is sure to be appealed all the way to the Supreme Court no matter who wins, will surely affect the computer industry and computer users for years to come.

In addition, the decision will also serve as a guide to the Justice Department in the preparation of its case against IBM, most observers believe. A decision favorable to Telex is seen as a spur to hurry the government case and a decision against Telex is seen as delaying the government action even further.

Oral Summation

The only remaining court action planned in the Telex case will come June 18, when lawyers for both sides will be given three hours each to present their concluding arguments before the judge.

In addition to these three-hour oral summations, the lawyers for each side have been required to submit written arguments pointing out the legal precedents for their positions and outlining

Expectation, Reality Mark NCC's Opening

By a CW Staff Writer

NEW YORK — An attendance that could exceed 30,000 and the return of IBM as an exhibitor in a national DP trade show after a long absence are both the expectation and reality of the first National Computer Conference and Exposition (NCC) which opens here this week at the New York Hilton and the Americana hotels. Two hundred-and-sixteen firms are expected to exhibit in 620 booths at the New York Coliseum.

Officials of the sponsoring society, the American Federation of Information Processing Societies, said the \$200 pre-registration figure is ahead of that for the 1972 Fall Joint Computer Conference when 21,000 persons attended in Anaheim.

But since two of the largest segments of (Continued on Page 8)

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User Fate Hinges on Telex-IBM Verdict

(Continued from Page 1)

It will likely point out that even the IBM planners, quoted at length in the IBM documents, treated that market segment as separate and planned their actions in order to beat back competition in that area.

Telex will then show that from the IBM documents and the IBM census figures IBM clearly dominates that segment of the market, holding a greater than 85% share of it in all areas and by all yardsticks.

'So What' Defense

On the other hand, IBM will probably stick to its defense as outlined in its motion for dismissal. Telex finished presenting its witnesses - a defense that has been characterized by some lawyers as a "so what" defense.

IBM contends there is no separate market for peripherals equipment attached to IBM equipment. Therefore, even if Telex proves that IBM has a large share of that market, IBM cannot be found guilty since no firm can be accused of monopolizing its own product line, it contends.

The market definition issue is the key here as it was in most large antitrust cases in the recent past.

If the judge accepts the Telex argument that there is indeed a separate market for peripherals equipment that attaches to IBM systems, then it is likely he will have to find IBM guilty of monopolizing that market.

If on the other hand he accepts the IBM view that there is no separate market as Telex defines it - if he finds that in fact IBM peripheral equipment competes against other systems from mainframe

Clarification

TULSA, Okla. - While IBM President Frank Cary admitted IBM did hire some engineers from its competitors [CW, May 23], he did not hint this was done to catch up with developments in the competitors' laboratories. The hinting was done by Telex lawyer Floyd Walker in his cross-examination of Cary.

In addition, Cary never specifically admitted IBM was behind those competitors in development of field effect transistors. Again, this was implied by the questioning of the Telex attorneys.

And while Cary did admit the dynamic address translation box that was sold for \$200,000 cost IBM only \$8,960 to build, he tried to indicate in his testimony there were other costs associated with marketing and servicing it. He did not give specific details of these additional costs.

Correction

The correct address of International Publications Services, from which the British Computer Society Code of Good Practice is available in the U.S., is 114 E. 32nd St., New York, N.Y. 10016.

makers and from the competition of such things as time-sharing and service bureaus - then he will probably find IBM innocent as charged, lawyers indicated last week.

IBM Counterclaim

The action on the IBM counterclaim that accuses Telex of stealing trade secret information will probably hinge on the action in the Telex case, sources indicated.

The judge could of course find both of the firms either innocent or guilty, but lawyers noted last week that if IBM is found guilty of monopolizing the industry, then Telex would probably be found innocent on the trade secrets charge.

However, if IBM is found innocent of the monopoly charges, it does not necessarily follow that Telex will be found guilty of the trade secrets charge, they indicated, noting that in this case the counterclaim would stand or fall on the weight of the evidence.

At this point, within a month-and-a-half of the final decision, it is hard to tell who is winning the case.

Telex has been able to get further with its suit than any of the 12 other firms that have filed antitrust actions against IBM, something of a victory in itself.

However, the IBM legal team is one of the best, if not the best, in the nation and it was extremely effective in countering most of the Telex charges in the courtroom.

Much of the outcome will, however, hinge on how the judge interprets the documents and depositions introduced into evidence but not presented in the courtroom.

370 DOS Modified to Run on 360

(Continued from Page 1)

the application programs include 370 instructions. Some tests indicate, in fact, that executing (simulating) 370 instructions in the "real memory" environment of the 360 is faster than executing the same instructions in a VS environment on a 370.

The 370 instruction compatibility on the 360 also means that all current packaged software development - even if intended for the 370 market - can be used on the 360s.

Complement, Not Conflict

Itel and The Computer Company have been at least talking to one another as their work progressed and it appears that their new products will complement each other without conflict.

The Edos people noted, for example, that users who have the Itel 7330 support don't need the special Edos 370 instruction support feature.

A decision for Telex will certainly boost the independent peripherals manufacturers - and several of them will surely follow the Telex lead and file suits of their own against IBM.

The consequences of these suits against IBM could be even more damaging than the planned government case against the giant, since several treble damage suits of the type filed by Telex could probably bankrupt a firm, even one with the resources of IBM.

In addition, a Telex win in this case could help the government in its case, since it would indicate the judicial climate was ripe for antitrust actions of this type.

On the other hand, a Telex loss might serve to delay the government case and make the government more amenable to negotiation of its suit against IBM.

In addition, several sources in the independent peripherals industry feel a Telex loss might also serve to notify IBM that it could take any action in that industry without fear of punishment.

They indicated that if Telex loses the suit, it would be highly unlikely that any other firm in the business would enter the arena against IBM in the near future, no matter how damaging it thought IBM actions were to its business.

A Telex loss also might serve to allow IBM to take any action to force out competition since it would not have the fear of antitrust action hanging over its head from the other plug-compatible manufacturers.

Whatever the results, they will be known by the middle of next month. The latest betting line is 3 to 2 for IBM.

Bul Edos can provide a broad range of system support facilities that are available from Itel or through IBM's DOS coding.

These include load balancing between partitions, storage of programs in relocatable form and blocked fetching of program phases, as well as spooling of output and, on a special feature basis, support for six partitions instead of the normal three.

Itel is basically a hardware vendor and doesn't want the burden of a full software maintenance staff. It reminds its users that IBM will not support the use of DOS 27 on 360 hardware. The Computer Company is a software company and it can support either Edos or the Itel-coded software modifications.

Used in combination, the two companies and their new DOS enhancements can be expected to add considerable life to the 360 user base, in the view of one industry observer.

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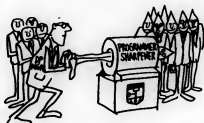
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Back on the Job

Epilepsy, the three-and-one-half-year-old chimpanzee who gave data processing a one-day fling before returning to a zoo in Germany [CW, May 30], makes his second consecutive "debut" on the pages of *Computerworld*, this time in fully unabridged form.

False Arrests Spark Police Mea Culpa

CW West Coast Bureau
SAN FRANCISCO—In the wake of several false arrest suits, the police department here has publicly apologized for inaccuracies in the computer system used to identify wanted persons. "We are very sorry for the errors we made," said Capt. Jer-

niah Taylor, although he said the errors were those of human oversight rather than the computers themselves.

The police department has been sued for amounts up to \$1.5 million by persons who claimed they were detained on charges ranging from failure to

pay overdue parking warrants to felonious auto theft.

The latest suit was brought by a San Francisco couple who contended they were arrested, roughed up and held for 18 hours because the computer reported the car they were driving was stolen. They said their auto was stolen two years earlier and returned to them.

Taylor said the police department's warrant system is used by nine counties and officers in outlying counties and municipalities who query the system by radio are supposed to make a direct verification by telephone but have neglected to do so.

State Reregisters Voters the Modern Way

By Ken Shook
of the CW Staff

FRANKFORT, Ky.—Kentucky has shifted to computerized voter registration after the state legislature ordered a complete reregistration of all the state's voters.

The computerized system will give the state for the first time a master file of all the voters by precinct and enable the state to give the news media and other organizations breakdowns on voters in time for state elections this fall, according to state officials.

County Imbalances

The legislature's move came after newspaper accounts re-

vealed that in many counties voter registration lists were seldom purged and frequently not kept up-to-date, resulting in imbalances between counties.

The governor and his aides said a computerized voter registration system as the least expensive and the most administratively sound of the alternatives as well as the only sure way of registering all of Kentucky's nearly one and one-half million voters in time for state elections this fall, according to state officials.

The computerized registration system provides for automatic purging of the voter lists, eliminating the need for local purging boards. Instead, the state Board of Elections has set up an appeals procedure for purged

voters. Monthly update printouts will go to each county clerk.

The state's Department of Finance and Administration is handling the operations on an IBM 370/155 with 500K. The voter registration operations are utilizing up to 100K, according to the state. The State Election Board is using a remote 370/155 with a 145 as backup.

There are about 46 video terminals with light pens throughout the hospital and 26 ink jet printers.

Cost of running the system comes to \$82,750/mo and is expected to save at least that much in the long run, officials believe.

Almost 72% said that "demonstrable cost savings would influence my decision."

A broad review of the system—including a federally requested study—will be released this month.

The \$12 million system was developed by the Lockheed, which later sold it to Technicon, Inc., Tarrytown, N.Y.

It was installed in January 1972 and became fully implemented in October.

The system is set up to handle all physician orders, pharmacy functions, admissions functions, scheduling of lab tests and medication as well as all business office functions.

Information entered into the computer is sent to appropriate parts of the hospital and communication is through numerous terminals, which include CRTs and light pens.

What is said is fully integrated into the operations of the hospital. "Virtually everyone in the hospital uses it."

The system runs on an IBM 370/155 with a 145 as backup. There are about 46 video terminals with light pens throughout the hospital and 26 ink jet printers.

Cost of running the system comes to \$82,750/mo and is expected to save at least that much in the long run, officials believe.

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And Maybe by 1990...

JACKSON, Mich.—Traffic in Jackson County, Mich., should be flowing smoothly by 1990, thanks to a computer which is now developing a master plan for the Jackson Area Comprehensive Traffic Study (Jacts) committee.

The Jacts technical and policy committees test their developing plan by feeding it into the computer, which then assigns traffic loads projected for 1990 onto the road network. The printout shows which roads will be overloaded if the plan is fully implemented. Then the computer shows how a specific modification of the plan will affect traffic flows on other roads.

The committees' final plan will be the basis for distribution of federal and state road and highway assistance funds over the next 20 years.

The Jacts committees expect to test four modifications of their plan before the development deadline date in July.

Nato Air Defense Now on Target

LONDON—A \$300-million computerized air defense system, which stretches from Norway to Eastern Turkey is now operational.

The Nato Air Defense Command (Nadco) is a chain of early-warning radars and data traffic sensors, tied to a data communications network and computerized control centers. These are combined with interceptor bases and ground-to-air missile sites to provide "detection-to-destruction" protection against hostile aircraft.

Long-range radars search out unidentified, and potentially hostile, aircraft. Electronic sightings are fed into computers which record their speed, altitude and course.

The computers are preprogrammed with such information as identification codes of friendly aircraft, weather conditions,

enemy forces available, and possible methods of attack and defense to determine if a sighting is a "known" or "unknown" aircraft.

Once a detection is classified as "unknown," military officers may order an interceptor aircraft to visually inspect the unknown aircraft.

In the event of a possible missile threat, the system is fired to destroy intruders.

A Signal to Pollution

SALT LAKE CITY, Utah—Computerized traffic signal control will help Salt Lake City meet 1975 federal standards on carbon monoxide in the air.

Streets Commissioner Stephen M. Harman said the city will have no difficulty in securing and implementing the control system, which is aimed at smoothing traffic flow and therefore reducing exhaust output.

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bought GMI Epoch 4 to start with,
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seem like too much to pay for the
security of a permanent computer tape.

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new job.

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How to Make a System Secure ...

(Continued from Page 1)

should be strong, glass windows avoided and waste materials avoided.

Employees' Integrity

- The integrity of the employees must be assured.

Tighter controls in the personnel department are required. Also, test the integrity of your employees and find out what their goals and merits are.

"A personnel application can be very revealing about an employee and a keen eye can pick up things like that."

- Data processing security should have a system of checks and balances to insure the accuracy of data, Schneider believes. "We watch input and output. We look to see if cards are slipped out of place, errors tacked onto programs or modifications made to programs."

Unauthorized use of the system has to be prevented, he said.

Schneider suggested it is sometimes helpful for evaluation to shut down a system for a day and run it manually.

"It would pick up a lot of programs written into the system which the user is not familiar with or may not be aware of."

- Host computers or host minicomputers can be set up alongside a computer to watch the programs.

"It is like an armed guard who watches a printout."

- A data scrambler can stop unauthorized data taps, which are "one of the easiest ways to get into a system," Schneider continued.

A person using a data tap can "record all the passwords and procedures to access a system," he said.

Manufacturers, Schneider said, should now think about security in the design of their new systems and think about implementation of host computers or minicomputers as auxiliary controls for security. "Manufacturers should get together with consultants to find out what the problems are and develop products

needed in security instead of introducing customized products for particular security applications."

Schneider said his firm, which now has a staff of 13, will soon merge into now dormant Electronic Data Processing Security, Inc., Los Angeles.

In addition to services, it will offer products such as electronic locks, closed circuit television, monitoring consoles, supervisory panels, remote-access beeping systems, low-cost data scramblers, debugging devices for telephones and paper shredders.

The new firm, Schneider said, will offer a braintrust that will be able to sit down and study security problems on a project-oriented basis.

The major effort, he said, will be in "perpetrator analysis," which he described as a technique to challenge system security by looking for weak points to try to break the system.

Before helping to organize EDP Security, Inc., Schneider tried to join the telephone company but "they didn't want any part of me."

370 Lease May Save User 30%

CW Washington Bureau

NEW YORK—Users can save between 10% and 30% on a new 370 lease program being offered by Ford Motor Credit through DPF, which will be the marketing arm for the new program.

Under the new leases, which run from three to seven years, users can save 10% on a three-year deal, 14% on a four-year plan, 18% on a five-year deal and 30.6% on a seven-year lease. All of the plans can be terminated after three years, but if a user has signed up for a longer term he will have to make up the difference between that rate and the three-year rate, DPF said.

The plan applies to all IBM 370 CPUs with the exception of the 155 and the 165, the firm said, and the rates are for CPU and memories only.

The savings on a systems basis could be much higher, sources indicated, if the user chooses all independent peripheral equipment with his system, since the independent peripherals can

be offered also at a discount over the IBM price for the same devices.

Peripheral equipment with the new leases will be offered by DPF from a wide range of independent peripheral companies, the firm said.

At the same time, DPF will continue to offer its long-term eight-year leases which promise the user greater savings over the IBM prices if he is willing to commit to such a term and which come packaged with independent peripheral equipment.

In the area of upgrade penalties, DPF said that in all cases its penalties for upgrading would be less than the ones charged by IBM on its four-year lease.

There are also some interesting extension privileges under the new plan. If a user, for example, under a five-year plan at the end of three years, decides to use the system for another three years, he can sign a new three-year contract and have the monthly rental reduced to 75% of the IBM price instead of the 82% he would have been paying on the five-year plan.

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NCC Marked By Expectation

(Continued from Page 1)

attendees, the exhibitor guests and the exhibit-only attendees, do not generally preregister, officials said the preregistration results are not a fair indication of total attendance.

IBM's first appearance in a national DP trade show since 1970 will be highlighted by a System/3 Model 10 which, along with a 370/145 located off the floor in the Coliseum, will support multi-application demonstrations in areas such as medicine, government, education and manufacturing.

Outgoing executive director of AFIPS Bruce Gilchrist defined AFIPS' challenge as how "seriously it wants to attack major problems within the industry," and named two, standards and standardization.

"These are major issues which I think need an overall and responsible approach, but they're tough issues, because they immediately get you into a position of having to address major economic problems."

"Obviously, you tread on people's toes when you do that. If you only attack minor issues, no one bothers you," he observed.

"People within the field should have a strong voice to address key issues, and not wait for the manufacturers or the government to make the decisions for them," he urged.

Replacing Gilchrist as executive director of AFIPS will be Robert W. Rector, who will assume his new responsibilities July 1, concurrent with the beginning of AFIPS' fiscal year.

Rector is currently chairman of AFIPS' finance committee.

The "251" is an exciting addition to the completely compatible NCR Century family of computers. Many of the outstanding performance characteristics of its big brother, the NCR Century 300, are inherent in the "251" at considerably less cost.

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and job status displays, and touchplate control for rapid operator response. Other features include: I/O spooling, unit and file sharing, automatic job scheduling, remote job entry and dynamic resource allocation.

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NCR
Terminals & Computers

DPMA Show Hopes for Success, Must Buck Competition

By Edward J. Bride
or the CW staff

CHICAGO — Faced with competition from two other major computer conferences within three weeks, the Data Processing Management Association (DPMA) will host its annual conference here June 25-29.

Officials are hoping the exhibitor and attendance totals of last year (70 companies, 5,200 total attendance), when the show was held in New York, could be equalled.

The format is similar to last year's, with opening-day sessions comprised of industry tours of DP centers, and second-day events consisting of all-day workshops and the exhibit, which opens at 10 a.m. The speech-making and seminars begin on Wednesday, June 27, with the keynote being given by William L. Lindholm, vice-chairman of the board and chief operations executive with AT&T.

Information Management

Most of the individual workshops are

being chaired by industry marketing experts, with some led by consultants; a few users will also conduct the seminars in the conference, whose theme is "New Dimensions in Information Management."

DPMA said recently that some 50 companies had signed up as exhibitors, including IBM and Univac, with others in the peripherals and supplies fields.

Three weeks before DPMA is to open, the first annual National Computer Conference and Exposition is scheduled for New York City, and that same week, here in Chicago, the American Bankers' Association will hold its annual Automation Conference, one of the biggest of the banking industry's data processing shows.

Workshops, Seminars

The six separate one-day workshops scheduled for June 26 include meetings on banking, government applications, insurance, manufacturing, medical/hospital applications and systems development.

For the most part, these concurrent sessions are conducted by large users such

as Harris Trust and CNA Insurance. All meetings and the exhibit will be in the Conrad Hilton Hotel.

DPMA defended its choice of industry insiders to conduct the other workshops, noting the speeches would be "interdependent" of the equipment manufactured by session chairmen.

Who Will Speak?

Examples of session chairmen include the national sales manager for CDC's time-sharing operation, who will conduct a seminar on time-sharing applications; the product line manager for Digital Equipment Corp.'s business systems division, who will conduct the session on minicomputers in business; the national sales manager for Stromberg Datagraphix, who will talk on microfilm (reviewing "various techniques and equipment," DPMA said); and the manager of AT&T's planning and regulatory support activities, who will speak on inter-connection and implementation of integrated data communications systems.

John Guerieri, DPMA's director of research and professional services, said the selection of marketing personnel provided "some of the best people available" for public speaking.

Although technical people are usually familiar with the equipment, the sales people are generally more up-to-date on applications, he noted.

He also said DPMA had had good past success with this approach.

The week's program finishes on Friday with an open seminar on visually impaired programmers; the exhibits close Thursday at 6 p.m.

Information is available from DPMA headquarters, P.O. Box 502, Park Ridge, Ill. 60068.

N.Y. System Promises To Ease Overcrowding In Hospital Wards

BROOKLYN, N.Y. — A computer-based system is helping relieve overcrowding in pediatric departments of nine major medical facilities here by sending some patients at crowded hospitals to under-utilized facilities.

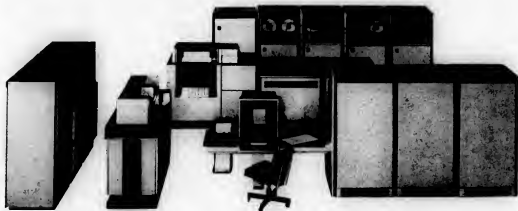
The program, called Embers (Emergency Bed Request System), was devised to include eight institutions: Methodist, Long Island College, Kings County Center, Jewish of Brooklyn, Coney Island, Kingsbrook and Greenpoint hospitals and the Bedford-Stuyvesant Health Center, all of which are linked with Downstate Medical Center's computer center by direct telephone cable.

Where to Go

"The computer compares pertinent information concerning patient needs for hospital admission with stored and continuously updated information of the availability of pediatric beds, and notifies the referring and receiving hospitals of the most appropriate disposition of the patients," according to Dr. Vincent Larkin, director of medical affairs for the Methodist Hospital and one of the system's authors.

The system becomes operative when the inpatient load in a participating hospital exceeds 90% of its pediatric bed availability. That hospital may request admission of a sick outpatient to another participating institution through the computer.

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Rush to Computerization?

Counties May Pay 'Too Much' for Voter Registration

By Michael Weinstein
and
Toni Wiseman
Of the CW Staff

IOWA CITY, Iowa—Several counties within this state are paying "two to four times" what they should for voter registration computer services, according to Merle L. Kopel, Linn County auditor, and much of the problem appears to stem from a rush to computerization.

The overcharging, Kopel said, is indirectly caused by the new election law which requires preselection registration in certain cities and counties. This requirement put a strain on local election offices, and officials with no knowledge of computer operations attempted to computerize the registration procedure in order to comply with the provisions of the law.

The 1970 bill requires every city with more than 10,000 voters and every

county with more than 50,000 voters to register these voters before each election.

Prior to 1970, in many areas voters would just show up at the polls on election day and vote. In most cases this was considered adequate as areas were small and most people knew each other.

But with the new law, many local officials had to develop a documented registration operation for the first time.

Varied Operations

These operations varied from city to city and most used computers in some form. For example, one city used the computer of a local college while another bought time from a local company and a third used the police computer on a part-time basis.

Before the 1970 law had time to settle into operation, however, a new law removed the responsibility from the cities and made the county auditors responsible

for the registration.

Practically, this meant many county auditors were charged with combining various infant city systems into a centralized county system.

To compound the problem, even had the auditors been DP experts, different cities were using different types of computers and different formats for data. At this point, the Iowa Data Processing Co., through its president, Stanley R. Zegel, offered some county auditors a complete computerized voter registration service.

Who Pays for What?

IDP billed for its services on a transaction basis, as opposed to computer time used or nature of the programs, so it was hard to determine the exact nature of charges and how they were accrued, Kopel said.

But despite this inability to determine

the cost of each portion, the bottom line cost has led to numerous attacks on the services.

Attacks have been directed at the cost and service provided by IDP and also at the system of no bidding that allowed IDP to go directly to the county auditors.

"I've talked to some of the people who have had his [Zegel's] service," said Kopel, "and they can correlate nothing on his bills as far as a standard method of billing."

Linn County, which had been using IDP's service, dropped it when Kopel became auditor. Kopel explained his actions:

"A representative of the firm [IDP] approached me about the sale of voter registration forms and voter registers for an amount of \$40 a thousand and \$35 a thousand respectively.

"I had already received bids of \$10.98 and \$13 for these same services from another source. Further, disregarding the financial aspects for a minute, we had already found his [IDP's] service inadequate for what we had to do. He ran the primary last year and mistakes abounded," Kopel said.

"Basically, they use scare tactics to take advantage of the naive," said T.J. Snarsky, director of information services for Cedar Rapids. "He [Zegel] gets the little towns upset because they don't have time to look at all this, and then offers his services."

Zegel defended his company's efforts: "It is not our obligation to see that [the county auditors] go out and try to find someone else who would try and do what we do."

"If someone else says they can do something similar to what we do, that's fine, they can make a proposal too."

But these are not the only factors, one official said. "Zegel is a registered lobbyist in the state and helps to write laws he is now offering service for. He is highly wired with state politicians and unless bidding is open and public there is too much of a temptation for local officials to act as political animals."

In any case, unless there is public bidding, the question of whether taxpayers pay four times as much as necessary for computer services will remain academic, he concluded.

N.Y. Harbor Dyed To Trace Pollutants

NEW YORK—With the aid of computers, the most polluted harbor in the U.S. may eventually see its waters clear again.

In an experiment sponsored by the National Oceanic and Atmospheric Administration, 11 small boats dumped a "harmless and biodegradable" yellowish-green dye into the ocean near the mouth of New York Harbor at 100 points from Ambrose Light to Coney Island. Airplanes and helicopters passed overhead mapping infrared, black-and-white, and color photographs of the dyed areas.

From the photographs, scientists hope to build a computer model of wave action and currents in the harbor, presenting graphic evidence of where pollutants travel once they enter the harbor's waters.

Scientists want to find out what percentage of pollutants are swept out to sea or get into the atmosphere through evaporation, so they can begin planning some means of control.

New York Harbor was chosen for the experiment because "about 70% of all the ocean dumping in the U.S. occurs either in or near New York Harbor," according to a Federal Environmental Protection Agency official.



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Through the eyes of current small business users, we'll be examining some examples of successful use of computers, and some of the pitfalls you're likely to meet in attempting to install smaller EDP systems. We'll discuss the problems involved in selecting the right equipment, summarize what computers can be expected to do, and examine the technical problems of implementing a system. We'll also weigh the advantages of outside software, and go over the question of whether or not an in-house technical staff is necessary. We'll be getting part of this information directly from small business users who participated as panelists in the 1973 Computerworld Conference. So you know it will be practically oriented, useful and timely.

If you use small EDP systems in your company—or if you're thinking of doing so—this June 27th Supplement is important reading. And if you're marketing small business systems equipment or services, your ad should be there. Close is June 8th.

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From Space Flights To Flood Monitoring —110A Has a New Job

By Toni Wiseman

of the CW staff

BIRMINGHAM, Ala.—RCA 110A has been permanently grounded and the National Aeronautics and Space Administration has reassigned it for duty at the University of Alabama, where it will monitor river floods rather than space flights.

The 110A is a digital/analog computer, designed specifically for NASA space applications and never marketed commercially. Only 24 were built, to be used for automatic testing of Saturn 5 vehicles. They have since been used to check Apollo and Skylab launches.

After it was no longer needed to check the Saturn 5 missile, the \$3.5 million machine was declared surplus and put out to pasture. The university was more than willing to provide a fresh "grazing" area.

The transition from NASA to the halls of academe was not an easy one for RCA 110A. In January 1972, Dr. Thomas Gatts, director of the university computer center, and four students went to Huntsville, Ala., dismantled the computer, loaded it on a truck and brought it back to the university. Engineering students there built a specially wired and air-conditioned area to house the machine.

It took students six months to reassemble the computer, and it wasn't operational until March 1973. Graduate students are currently writing a new and simpler language for the 110A so more students will be able to use it, according to Gatts.

In addition to solving student problems, the computer will help solve sewage disposal problems and regulate the flow of Alabama rivers through spillways and floodgates without damaging surrounding areas.

Livestock Auctions Updated

LAFAYETTE, Ind.—The price of beef may not be going down, but at least beef computers are keeping down the cost of running livestock auctions.

Scientists at the University of Missouri-Columbia have developed a computer system to handle sales data at auction markets.

The system, which has been used successfully for three years in Missouri, minimizes the possibility of errors in computations and preparation of records and accounts, speeds up payments following sales, and provides permanent records of all business transacted.

The UMC program developers estimate that adoption of the system can reduce clerical costs by 50% for the nation's 1,700 livestock auction markets.



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Editorials

Changing Communications

A bill now pending in the Minnesota Legislature could effectively eliminate any cost advantages enjoyed by users of non-carrier communications equipment.

The bill would subject all suppliers (who install and maintain equipment attached to the phone network) to the regulatory control of the state Public Service Commission. Such control as applied to phone companies has required full justification of prices based on costs.

Also, the state PSC might have to set tariff rates for all non-carrier communications equipment in the same way it now sets charges for the phone companies. This could mean the same rates for both carrier and non-carrier equipment.

The original intent of regulation in the telephone field was to assure all users basic phone service at a fair rate. But the world of communications has changed. There are now non-carrier suppliers who feel they can improve on certain services offered by the phone company.

To unnecessarily encumber these independent suppliers with the stringent demands of regulation would be grossly unfair to suppliers and users alike.

The Promise of System Q

The broad outline for System Q laid down by IBM planners points to a system that will be easier to use by both programmers, laymen and DP installation managers.

It is definitely a step in the right direction and if carried out should go a long way toward making data processing the easy-to-use commodity it should be.

But the lessons of the past indicate a great gap between the broad outlines for such systems and their reality upon release to the marketplace.

At the same time, IBM management committee minutes indicate there will be some trouble in providing all of the resources to develop System Q and to continue development of 370 programs in the 1973-74 period.

If, as the IBM management committee debated, there will be a struggle for the firm's software development resources during this time period, then there might be a tendency to drop development of some of the most difficult, but most potentially rewarding, features of System Q.

We hope IBM is still on schedule with System Q and the FS Series and that no features that would make the system easier to use have been dropped due to lack of resources for software development.

IBM likes to talk of technological leadership in the DP industry. Everyone will find out if it followed through with the System Q plans when the entire system is announced in 1975.

It's a long time to wait, but if the system lives up to its promise, it will be worth it.

Bird, Beast or ...?



Yes, It's True, DP Community Still Needs a Standard Code

By Thomas W. Kern

Special to Computerworld

The data processing community still has a need for an across-the-board standard code. Ordinarily, when we refer to a standard code we are referring to an established relationship between a number of binary bit patterns and a set of characters necessary for accomplishing the DP function.

In situations in which recorded data remains within the confines of a particular system or environment the choice of a code is almost immaterial and is subject only to influences such as those that may affect the processing efficiency of the particular application.

However, as the system matures to meet ever-increasing workloads, more DP equipment is brought into the inventory. One of the requirements that must be reckoned with when making additional procurements is that the new equipment must be able to handle the code.

Either it must be code-insensitive or it must accommodate the

present system code without any degradation of performance or the incurring of a cost penalty.

Larger Role Seen

It is at this point, the addition of code-sensitive devices to an existing system, that the original choice of code assumes a much larger role than had heretofore been attributed to it.

Viewpoint

In other DP applications where the system boundaries are not well defined and data is interchanged at various points within the system, the use of a standard code is the first step in achieving data transferability within the system.

One of the benefits of the acceptance of Ascii as a standard code has been its influence on the development of ancillary systems which, in turn, facilitate data and equipment interchange.

For example, there now exists a widely accepted standard for recording the code on punched paper tape.

A similar standard was developed for representing the 7-bit code on punched cards.

In this instance the standard was soon expanded in an anticipatory manner to accommodate an 8-bit code of which Ascii is a compatible 7-bit subset.

On a more controversial note, in the course of developing the first recorded magnetic tape standard, it was necessary to settle what became known as the "firing order" problem; i.e., the bit-to-track relationship of data bits in memory to the nine tracks of the tape. Without a standard code this relationship would have been relatively little meaning.

Of Standard Importance

However, having established the code and subsequently this relationship, widespread interchange of data on magnetic tape among different systems became

a common reality and not just a remote possibility.

More recently, in the development of the standard for the digital magnetic tape cassette, a device that did not exist as a DP product when Ascii was devised, it seemed only natural that the standard should specify the manner in which the standard code was to be recorded on that medium.

In still another area, fundamental problems were encountered in sending data across a pair of transmission lines. These were problems such as determining the sequence of sending the bits, the structure of characters within a bit stream and the type of error-detection scheme that was to be employed.

None of these problems can be termed code-sensitive; that is the problems wouldn't be radically different, or even become nonexistent, if another kind of code is used.

Instead, these problems would have been present regardless of the choice of code.

The point is that because of the acceptance of a standard code it became possible to focus the attention of the DP community on these problems and to develop standards to settle the relatively arbitrary technical questions which otherwise threatened to further complicate the process of data interchange.

In summary, if widespread data and equipment interchange is established as a goal, then probably the most important characteristic of the standard code has been its effect on the development of supporting standards to facilitate that interchange.

The cost of converting large files may preclude their being converted to the standard code; however, as new applications are initiated, new files can be structured with an awareness of the standards that support interchange. Within that set of standards, the standard code has become the keystone.

Kern is a member of the staff of the Industry Standards and Relations group at NCR.

Letters to the Editor

Cobol/RPG Dispute

Shows Standards Gap
Re the Cobol/RPG Controversy:

I can't believe the running controversy over Cobol and RPG. Who is trying to convince whom? There are advantages/disadvantages to each, but the letter writers attack the other side with a zeal that leads me to believe each side wants to either obliterate proponents for the opposition, or justify its own position, or both.

Efficiency, documentation, usability and other factors are being tossed back and forth with facts and opinions intermixed to such a degree that someone may well wonder, "Isn't there any way to objectively evaluate all this?"

It seems to me the heart of the problem is the DP profession's inability to produce a framework of standards, at all levels, that would perhaps provide more objectivity to controversies such as these. At least some common ground could be reached.

The ever-growing DP industry, a giant already, needs to get itself together soon, or there will be a great, fragmented area in our society, impeding progress in all areas. Where are our leaders? Or, where are the people in present leadership positions taking us?

Terry E. Berryman

Davenport College of Business
Grand Rapids, Mich.

Cheers for Compass

The article in the March 7 issue of *Computerworld* gives the impression that the NGPSS/6000 version of GPSS-V, developed by Norden for the Navy's CDC 6000 Series system, was coded on Cobol.

In actuality, the simulation package is a two-phase processor which used Cobol in the assembly phase and only for input stream syntax processing and data structuring. The GPSS execution phase required Compass for maximum speed and the output phase used Fortran.

Julian Reimann
Computer Simulation Branch
Norden Division
United Aircraft Corp.
Norwalk, Conn.
(former letters and viewpoints on Page 16)

Let's Not Reinvent Stonehenge

Third Generation of Computers Begins With Users

Data processing has a long 4,000 year history, certainly dating back to Stonehenge. It includes the different data processing machines produced by Babbage and son in the 1800s, the Whirlwind machine of the 1940s, as well as the families of machines that grew up in the 1950s.

Yet, all in all, there are presently only three major computer generations. These computer generations encompass all of the data processing systems so far, but I think it is useful to understand them.

The first data processing generation lasted from about 1900 B.C. to 1950 A.D. During this period a number of people had long, complex and worthwhile (on a national scale) calculations that had to be done correctly.

In each case, however, merely being able to get the right answers, without also being able to give greater authority to their right answers than had been previously possible, was fundamentally useless. It simply resulted in stalemates between equally qualified practitioners and consequent instability. The credibility that only an outside authority—such as a computer—could give was necessary. The four problems involved during this first generation were:

1. The Problem of Unforecast Eclipses. In the 1800s the tide tables for the continuation of smooth government. If the eclipse itself, or at least its possibility, could be foretold by the government, the government could avoid the disruption could be converted from a weakness to a strength. The problem was that there were too many scientists with different solutions, and no real way to tell which was right.

The solution was an official government computer, adopted after at least an 18-year observation and design acceptance test (Woodhenge). Now the government was safe since any programming error which occurred later (two cases were found, both involving the shift register) could be solved by putting the programmer to death, perhaps by dropping one of the bits on him. (They weighed a few tons, so this would be quite effective.)

2. Inaccurate Copying of Tide Tables. In the 1800s the tide tables for various parts of the world were being mathematically produced, but inaccuracies in copying the tables could not be prevented. As a result, various ships taking British goods to remote parts of the world were commanded by mariners who often ignored the tide tables if they felt that they could gain some advantage by doing so.

Many British ships were being unnecessarily wrecked, and the national interest was being hurt. Yet the mariners could show that the tables were untrustworthy and so could escape punishment.

The Babbage machines were designed to produce multiple and correct tide tables so that the mariners could not get away with ignoring them. National support was given (around \$10 million 1973 equivalent) for preliminary testing of digital solutions. (Actually, the basic design was faulty in that power consumption was not taken adequately into account, but a preliminary analog design solved the problem later.)

3. The Need for Long-Term Reliance on an Unstable Science.

In the 1940s, the design of the atom bomb was not merely complex, but was also something beyond the capability of mathematicians to manually hand-check each other's work at a sufficiently certain

level. No 18-year demonstration or partial development (as with Stonehenge and Babbage) was available.

With the use of data processing capabilities both the certainty of successful bomb development and successful bomb testing was much higher than it would otherwise have been, and the design was politically possible. Data processing therefore, permitted this long, expensive development to take place as it was able to reassure political, non-scientific opinion despite the lack of an acceptable demonstration.

4. Continued National Use of Known Inexact Data.

In the 1950s the first Univas Systems were installed in the U.S. Census Bureau. They were needed because the inaccuracy of the census count, and the long delay before its publication were hurting the census bureau's national credibility.

Suspensions that some of the data was being purposely excluded were unavoidable, and a suitable scandal could have pulled the whole census system down.

Forty years of data processing came to the rescue, with equipment that could guarantee that errors were accidental and were not deliberately introduced by census bureau personnel. There was a need for this kind of guarantee, as error rates of up to 5% continue even today in this area. Others besides those directly involved could check on the accuracy of the operation, and authoritative computer printouts could give credibility.

Same Basic Solution

Conceptually, there is little difference between the data processing systems of one-instruction-per-year, one-machine-code-instruction system at Stonehenge (Move Each Five-To-Bit in the Shift Register One Place to the Right), and the Univas 12-tape system with twin processors, separate tape-to-printer and keyboard-to-tape equipment that was installed in the Census Bureau.

Each of the systems was a special system designed and built for a special national project. The use of general-purpose hardware in 1950 was only, at that stage, a convenience which allowed easier alterations of the programs than hard-wired programming systems (such as Stonehenge) permitted. Thus the programmers were necessary when trouble arose as well as honored when it didn't.

This type of data processing, however, changed during the 1960s. The 1950 conviction that we would never need more than 18 or so machines lost out to the newly discovered utility of general-purpose computers. The increased understanding of the difficulties of programming and operating the computer combined with their potential utility made corporations around the country demand the advantages of in-house computers with their own programming staffs, and the prestige value of being "computerized" made the financial investment worthwhile.

Second Generation

The year 1959 represents the genuine beginning of the second generation of computers. The key event was probably the development of the transistor and its installation in the Univas solid state computers. This development made hardware reliability a matter of programming, rather than of engineering. Compatibility was also secured to a considerable extent by the use and development of Fortran, and the adoption of Cobol. Now the general-purpose computer is practically as immortal as Stonehenge.

The IBM 1401, therefore, was the major computer which made the mass use of data processing possible, as opposed to the pre-1960 generation, when only national problems were approachable.

Mass production gave rise to real fami-

lies of computers. Only programs and data structures could be incompatible across the different members within each family, so control of development was handled by programming rather than by the hardware.

During this period, the whole question of what a computer genuinely is was examined. In 1965 IBM proclaimed its "long life" doctrine, which put the immortal essence of a computer in a nutshell. IBM failed to follow up on its implications at the time, but rather operated under the concept of users changing systems every few years.

The second generation of computers, which lasted from 1960 to 1972, was marked by mass production. Eventually this mass production brought the supply of computers up to equal the demand, and the price of second-hand computers began to drop, even though maintenance and software were available.

The end of this second generation was signaled when the available computer supply started to exceed the demand. In 1965 IBM noted that computers, unlike most other systems, do not grow old. The paycheck produced by a computer that is 20 years old is worth just as much as the paycheck produced by a computer that has just come off the production line.

But a few years later production was stopped on one major computer system after another, starting with the IBM 360/30. But stopping production—or stopping marketing—did not stop the systems from being used. In fact, by 1970 there existed over \$10 billion worth of computers that could be continued in operation for 10 or 20 years.

User-Controlled Generation

The third generation of data processing is just starting now. Unlike the first generation, more than just national-level problems can be attacked by the third-generation computer. Unlike the second generation, the third generation can concentrate on the data processing task itself, as opposed to the problem of laying physical hands on a computer straight off

the production lines (and therefore having to pay the appropriate research, development, production and marketing costs).

Moreover, the signs indicate that during this new third generation the data processors will again have to take real responsibility for the accuracy of all their data processing. This will return to them the control over output accuracy they had during Stonehenge and the Census Bureau generation, but lost during the mass production era. No longer will an answer be acceptable just because it appears on a computer printout.

The signs pointing to this need for accuracy are all around us. The issues before names like Equity Funding, privacy and credit card handling. All these show the need for reasserting the data processing professional's control over the vast opportunities of the hardware, and the lack of a need to put more and more money into hardware instead of into improving the quality of data processing. The inability of the computer builders to provide quality applications is attested to in the contract forms which don't even guarantee that the operating systems or the compilers are barless.

I hope the users use their new control wisely. I hope they start putting accuracy before useless, quality before brand names. Only by building quality into our systems can we hope to achieve the real advantages that data processing has to offer the world. Without quality the world will not trust us with its important problems, and the lesson of Stonehenge—that is not enough to be right, it must also be obvious that errors are avoided—will once again have to be learned by the profession. And learned painfully, as usual.

We've reinvented the wheel too often already, let's not reinvent Stonehenge!

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The Professional's Viewpoint

Pros and Cons of Decision Tables

Decision tables have been around (or a number of years, and have been checked from various points of view. They are currently being considered in the Systems Committee of the Conference on Data Systems Languages (Codasyl) from a systems point of view.

Jonas Rabin of the Western Electric Co. has been asked to consider the potential of decision tables in systems design. He has drawn up a "status report" giving the pros and cons and a possible program of work for the committee.

The advantages of decision tables, according to the status report, are that they are:

- **Natural**—In transaction-oriented systems each rule corresponds to one or more transactions, thus making the logical breakdown of the program one which naturally follows human thinking.

- **Functional**—The decision tables are found to be helpful in dividing the system into functional units, increasing the modularity of the system. One or more decision tables is connected with each particular transaction type, and they assist in keeping the programs and their functions parallel.

- **Less error-prone**—The completeness of each decision table module can be assured at design time, thus making it, in general, a less error-prone system than that provided by other procedural methods. In other procedural systems it is often possible not to include treatment for one or more contingencies. Using the decision table format, this is quite unlikely so the reliability of the system is increased.

- **Better management control**—Decision tables make programs less "program dependent," and hence decrease the risk of management losing control over its information processing system. Decision tables are excellent documentation, and at the same time are machine-executable.

• **Productive**—The use of decision tables increases the productivity of software development and maintenance. A large part of maintenance in computer programs can be attributed to software errors, and changes in the enterprise itself. Decision tables improve the reliability, thus avoiding the software errors, and are also capable of being easily modified, thus making it possible to match the program to changes involved in the enterprise.

(It has been reported that the productivity due to the use of decision tables at Goodrich doubled, and that a study made in England by International Computers Ltd. showed the productivity advantage of decision tables ranged from 180% to 350% [EDP Analyst, October 1972].)

- **Position-Fixed Input Formats**—Decision table input formats, acceptable by commercially available translators, are position fixed and are extremely difficult to use initially, and later in modifying the tables. This becomes a serious problem when a large number of tables are involved.

- **Inefficient Code**—The code generated by existing translators is extremely inefficient. Obviously there should be a reasonable trade-off between the productivity advantage of using decision tables, and how much inefficiency in the generated code is acceptable.

- **Program Objections**—Many programmers are accustomed to thinking sequentially, and deci-

sion tables are a nonsequential technique. It is also possible that some programmers fear any degree of program automation. However, the use of non-procedural techniques does not reduce the need for people; rather, it shifts the emphasis on design and problem solving.

With these facts in mind, the suggested program for the task group is as follows.

- **Develop a design methodology of using decision tables in systems design.** For example, how to partition a problem into a system of decision table modules.

- **Study human-oriented and technical problems associated with using decision tables as both a communication and programming tool.**

- **Develop human-oriented decision table formats for both easy inputs and modifications.** This would also include editing.

- **Develop standards for diagnostic messages.** With present precompiler-compiler systems the user gets messages regarding logical errors in the decision tables, but error messages regarding the variables have no relation to the decision table structure. For example, it would be desirable to have a message for variable SUM within ACTION 3.

- **A subgroup could be working on developing acceptable performance standards for decision table translators.**

Anyone wishing to comment on the decision table task group recommendation, or on the pros and cons, may contact Jonas Rabin, Western Electric Co., Engineering Research Center, P.O. Box 900, Princeton, N.J. 08540. Comments can also be addressed to the Professional Viewpoint Page, Computerworld, 797 Washington St., Newton, Mass. 02160.

Letters to the Editor

Smart Programmers, 'Smart' Finances

The letter from John Cilleton Jr. (CW, May 21) noted we should make intelligent use of the power of the computer via smart programmers. How smart we are to think a system with all the bells and whistles is the answer. Segmentation, subscripting and message analysis sound like a TV commercial for an expense

product. DP shops are in many cases overexpensed because smart programmers insist on unnecessary smart hardware.

Intelligent use of the computer means intelligent use of the company's capital. RPG, ABC or XYZ. Smart programming or smart investing.

Jerry C. Swantek
President

Data Information Service Center
Bay City, Mich.

Let's 'Pool' Knowledge

Any Computerworld readers willing to share information about computer usage in setting up carpoles, please let me know.

L.A. Jaroch
St. Cloud State College
St. Cloud, Minn. 56301

Computerworld welcome comments to the editor. Letters should be addressed to: Editor, Computerworld, 797 Washington St., Newton, Mass. 02160.

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SOFTWARE & SERVICES

Random Notes

Report Facilities Improved By 'Total/Culprit' Update

BOSTON—The Total/Culprit output processor from Cullinane Corp. has been extended to users who are currently working with Cincom System's Total data base management system. Now, for example, information is available from the entire Total record, including the root and linkage segments.

A file definition subsystem provides the ability to catalog file and field definitions into Total data sets which, Cullinane said, eliminates the need to define logical fields in report parameter cards. The initial driving file in a path through the data base can be read either serially or directly, the company added from One Boston Place, 02108.

Xerox Computer Opens Office

NEW YORK—Xerox Computer Services has expanded offices at 767 Fifth Ave., here, and at 190 Moore St., in Hackensack, N.J., to serve the New York, New Jersey and Connecticut areas.

This expansion, following the mid-March opening of an office in Chicago, allows the company to provide coast-to-coast service to users with multiple locations. XCS is currently expanding its library of application programs to users who not only go through a heavy software development cycle to use the system.

Security Data Tapes Extended

NEW YORK—Interactive Data Services Inc. has expanded the number of statistics listed on the daily Investment Statistics Library (ISL) tapes.

The ISL tapes now include pricing data on 15,000 corporate bonds traded over the counter, bringing to approximately 25,000 the total number of securities carried on the tape. Working through a 360/40 in downtown New York, the company is able to get the magnetic tapes of the current day's trading to some users by 6:30 p.m., a spokesman claimed.

Retail Plans Simulated

FT. LAUDERDALE, Fla.—Property developers and management of retail chain stores can determine the potential sales volumes for various locations, before they start building, through the Retail Sales Site Evaluation System service now offered by Creative Realty Concepts Inc.

Factors used by the basic simulation programs are customized to the type of retail outlet the user is considering, and the tables reflecting the buying patterns of specific areas are maintained by Creative Realty. There are fixed charges for the use of the system and the user is also responsible for the computer charges accrued when his run is processed, a spokesman said, from 1385 E. Oakland Park Blvd., 33308.

Task Group Survey Finds

Government Users Avoid Switch to Ascii

By Don Leavitt

WASHINGTON, D.C.—The American Standard Code for Information Interchange (Ascii) is being used by government agencies for those files and other data streams that are being interchanged, but there is continuing operations-level resistance to converting non-interchanging files to the standard code.

A preliminary report of Federal Information Processing Standards (Fips) Task Group 12 (TG 12) also shows that interchange of information between agencies is still minimal and as a corollary, the use of Ascii is also at a low level. Most agencies answering a TG 12 questionnaire indicated that the bulk of their work—programs and file data formats—is carried in whatever native code their computer configuration utilized, or in an earlier code being handled under emulation.

The failure to switch to a common code could cause real problems in case of natural—or man-made—disasters since programs and files are not now transferable to other sites if the need should arise. This lack of interest in self-protection by government agencies is, unfortunately, typical of major industrial and business DP users as well, a TG 12 source noted, adding that he hoped they might now at least recognize the problem and the potential solution offered by Ascii usage.

Review Board

TG 12 was formed last fall to review the effectiveness of requiring governmental agencies to use Ascii in interchange situations, a directive that has been in effect since 1969. Under Fips Publication 7

(PUB 7), government installations were called on, to include Ascii interchange capability on all new systems proposals. Most of the agencies that have sought new equipment since then have complied with that requirement.

One interesting finding of the TG 12 questionnaire, according to a task group member, has been the amount of government DP work still being done on second generation equipment developed before Ascii was established, or on "third generation" gear working in emulation mode.

The push for Ascii in 1969 was intended to get as many government installations as possible to work in a common code, but the effort apparently was too gentle. Promulgators of Fips PUB 7 saw it as a means of protecting agencies against disasters by allowing complete transfer of programs to alternate sites.

Drive Stalled

But, the TG 12 source noted, the directive keyed only on the idea of common code for interchange of information, and since most agencies don't swap information to a great extent, the Ascii drive has been almost stalled. The provisions of Fips PUB 7 that allow waivers of the Ascii requirements are currently so vague that any diligent DP director can probably apply them to his situation if he feels so inclined, the task group noted.

Impetus to shift to Ascii for efficiency, protection against disaster or for any other reason has to come down from the management of a DP installation, not up from the operations staff. The shift probably should be a time-phased effort and will involve considerable time, effort and money, but it would seem to be worth the cost, the preliminary report suggests.

User's Source Program Studied; 'Metadata' Creates Dictionary

EL SEGUNDO, Calif.—DOS/360 users moving toward a full data base management system can gain control of their files and possibly improve the structure of their applications with the Logic Metadata System now available from Logica, Inc. In its current form, the Metadata system is a data directory and dictionary which analyzes where the user's data is, what programs would be affected by a change in a data element, and similar planning functions.

Even though the full-blown data base management system isn't ready yet, data being monitored by the Metadata system can be accessed in the user's choice of Cobol, Fortran, PL/I or Assembly language through a separately priced host language interface module.

Capabilities

Descriptive information is entered on punched cards prepared from unique specification sheets, or a data definition from Cobol source programs, on cards or from the user's Cobol library. Any of these entries can be modified later to keep them current, the company said.

Running all of the existing programs against the system provides the user with a listing of every place in every application program in which a data element is stored or edited. In addition, the narrative capability can be used to specify the sources and end users of each element.

The combination can in many instances identify redundancies in data already stored and used, and in some cases eliminate the need to write new programs to generate data, since the user may find the data he wants already exists, a Logica source said.

The system is modular and is designed

to run in a 64K DOS partition. The minimum configuration consists of the Metadata Base and the Data Description Module, a combination which can be licensed for a one-time charge of \$7,500.

The more complete system includes modules for describing any data base or file structure, source inputs and reports, and processing functions, in addition to the minimum Metadata elements. This larger system is available for a total of \$18,000, including maintenance, training and several utility programs. The host language interface is priced at \$5,000. The firm is located at Suite 136, 931 S. Douglas St., 90245.

DEC Enhances Basic for PDP-11

MAYNARD, Mass.—PDP-11 users can have up to 15 times faster throughput working with Basic programs controlled by either of two new language processors now available from DEC. But there is a price—literally—for this improvement since the new Basics are licensed products.

Basic PTS (Paper Tape System) is a core-only single-user Basic designed for use by generalists in interactive environments. RT Basic PTS is a real-time extension of the simple system, with 20 real-time commands, and is intended to supplement DEC's Laboratory Peripheral System (LPS-11) that links PDP-11s to lab instruments.

Basic uses simple English-like statements and familiar mathematical notations to perform various operations. Basic PTS features an optional string capability that enables core-conscious users to eliminate that support and reclaim program space

when string manipulation is not needed.

The new Basic also provides a CALL subroutine that allows easier interfacing with assembly language functions, and interrupt-driven support for a line printer and high-speed paper tape devices. Several PDP-11 floating point options are accessible under the Basic PTS logic, a DEC spokesman added.

RT Basic PTS and LPS enable the user to monitor various instruments, specifying sampling rates and duration of the experiments. The software has modularity similar to that of the hardware so core used by the system is kept to a minimum, and the application program can utilize more space with an optimum of efficiency, according to the company.

Basic PTS and RT Basic PTS are available from DEC through license for one-time charges of \$500 and \$700, respectively.

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Grandson of Dracula?

NEW YORK—An interactive software system developed by Blood Bank Management Corp. (BBMC) enables hospitals to control blood bank inventories and "sharply reduce" the number of units of blood lost because they are unused while still fresh.

The Fortran-based application can be installed on a using hospital's in-house CPU or accessed through the Boston-based time-sharing facilities of Computility Inc.

It suggests order quantities for all supplies used by the blood bank and provides a daily patient billing report for the accounting department. In addition, complete individual patient records are maintained for retrieval whenever the particular patient again utilizes the blood bank.

The prior record and answers to newly-posed questions are combined by the system to determine the oldest unit then available for cross-matching.

The Computility time-shared implementation has the potential of supporting inventory sharing between hospitals or a master listing of all donors within a community so that emergency situations can be handled effectively, BBMC added.

The software requires 60K characters of core on Computility's Deystem-10 but probably can be adapted to different configurations as long as the target CPU supports an on-line Fortran compiler.

BBMC is at Suite 303, 370 Lexington Ave., 10017.

'PBP' Uses Standard Coding Schemes In Handling College Administration

PISCATAWAY, N.J.—Colleges and universities with any of several CPUs can avoid the effort of developing their own administrative applications and, at the same time, work with code schemes compatible with common classification structures, if they install the Payroll, Budgeting, Personnel (PBP) system from Integral Systems Inc. (ISI).

PBP is designed to solve many problems that are unique to a college or university environment, including the tighter fiscal controls now imposed by various governmental and funding agencies, and the often complex payroll distribution and cost accounting required by the institute's various faculties and supporting staffs.

PBP is made up of three independent but integrable modules, each having file maintenance and reporting phases.

All modules are essentially "table-driven," working from the Control Tables File which is accessible to the user so that he can shape the processing to the needs of his institution.

The data encoding used by the system conforms, where possible, to Western Interstate Commission on Higher Education (WICHE) and Higher Education

General Information Survey (HGIS) taxonomy, allowing the user to maintain information-compatibility with other institutions of higher education.

Indicative of just how unique are the approaches used by systems of these institutions is the cross-checking done by PBP to determine which departments are over-committed on salary.

The system can, if desired by the administration, prevent the issuance of paychecks if funds just aren't available. Similar lockouts can be imposed against individual employees who have overused their sick leave, vacation or personal leave allowances, ISI said.

PBP runs in 54K under DOS/360 or in a 90K region under OS, but has also been adapted to work under Burroughs MCP and Univac Exec-8 environments. ANS Cobol source code is provided with all modules.

Prices range from \$10,000 to \$60,000, depending on the modules selected and the specific installation support requirements of the user. ISI is at 82 Lenox Court, 08854.

Mohawk 2400 Gains Concurrent Tasking, More Hasp Support

UTICA, N.Y.—New support, primarily software, has been introduced by Mohawk Data Sciences to make its System 2400 processors more versatile. The enhancement hasn't actually added to the types of tasks that can be handled by the units, but it has allowed several tasks to be conducted concurrently.

Until now, the 2400 has been either a remote batch terminal, a stand-alone "peripheral processor," or a key-to-disk data entry system, depending on the configuration. The tasks could be user-selected and changed over time, but at any given time all visual display and keystrokes in a 2400 system were "dedicated" to the same operating mode.

Now, concurrency support software allows the combination of key-to-disk entry operations on the 2401 processor with one of three remote job entry communications packages or with the Platon tape-to-print utility package. RTE support includes the choice of 360/20 Hasp, IBM 2780 and IBM 2968 tape-to-tape communications.

The 360/20 Hasp emulator has been expanded to allow communications from one MDS system to another, the spokesman added.

Other communications packages in Mohawk's collection of bundled software include Gert, an emulator for use with large Honeywell GE CPUs, and Mohawk Terminal Access Method (Motam), which allows the 2400 to handle up to 8 asynchronous communications lines when used with the new 2429-1 concentrator.

Other software now includes an industry-compatible RPG II language processor, enhanced to provide faster throughput; a tape monitor system for job stream control on user written programs and general purpose utilities; and a faster sort/merge package with READ BACKWARD tape capabilities.

Data Base System Guide

New Available From Q.E.D.

WELLESLEY HILLS, Mass.—The 340-page guide, *Data Base Management Systems: A Critical and Comparative Analysis*, describes the similarities and differences of various data base systems, including IBM's IMS, Cincom's Total, MRI's System 2000 and Software AG's Adabas (CW, Feb. 28).

Developed jointly by Performance Development Corp. and Q.E.D. Information Sciences Inc., the book is available from Q.E.D. for \$385, and includes updates through the end of 1973. Q.E.D. is at 170 Worcester St., 02181.

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35% Savings Seen **RCA User Group to Share AT&T Lines**

By Ronald A. Frank
Of the CW Staff

NEW YORK — A joint user group that could provide data channels at savings up to 35% less than comparable AT&T circuits has been formed by RCA Corp.

To be administered by RCA Global Communications, the joint user service will use time-division multiplexers to subdivide 3002-type voice-grade data channels leased by RCA from AT&T.

Initially, the nationwide service will be available in New York, Chicago, Detroit, San Francisco and Los Angeles. But users will be able to link into these user group terminal cities by means of local loops or longer distance Bell facilities.

Joint-Use Provisions

The joint users group will operate under the sharing provisions of AT&T tariff 260 which covers private-line service. Under these joint-use provisions, one user (in this case RCA) acts as the AT&T cus-

customer and has overall control of the group's operations. RCA will also operate and maintain the multiplexers that will allow users to share the Bell facilities.

Although the exact circuit capacities of the user group will depend on customer requirements, up to 75 low-speed lines can be derived with multiplexers from one 4kHz voice-grade channel, according to RCA. The initial system already in-

Bell Plans M

cludes seven users who have subscribed for 25 of the available lines.

include \$640 mileage charges and \$90 for access charges (\$45 at each end). The joint-use mileage charges will range from 20 cent to 40 cent/mi/mo, depending on total length, an RCA spokesman said.

Although RCA as the joint user administrator will collect all bills, users will receive separate statements from AT&T notifying them of their allocated costs of the shared facilities.

And RCA will also act as interface with the phone company for the user. This means that RCA Global will assume end-to-end maintenance responsibilities for the user, RCA said.

The initial five-city network is expected to begin operations "within the next several weeks." The system will include Codex modems and Infotron multiplexers installed at RCA sites in the five cities. Eventually the system could grow to 35 cities, depending on user acceptance, an RCA spokesman estimated.

Initial customers for the user group include RCA Corp., Mitsui Bank Ltd., The Tokai Bank Ltd., NYK Line Inc. and Sanwa Bank, all of New York. Other users include Electronic Memories & Magnetics Corp., Hawthorne, Calif., and Retla Steamship Co., Long Beach, Calif.

Information concerning the joint user group is available from Kenneth E. Ryan, RCA Global, 60 Broad St., 10004.

On a New York-to-San Francisco link, a Bell user with 75 bit/sec service would pay \$1,361/mo while a joint user group customer would pay \$940/mo for the same capability. The RCA charges would

Bell Plans Modems and Expanded DDS

offering from AT&T could help such users.

The DDS enhancements for the service scheduled to begin early in 1974 are subject to regulatory approval. They include "intrastate service on a selective basis," Stuehrk said. Work is also "well under way toward supporting an interstate filing for DDS" and a tariff will be filed "in time to meet the proposed serv-

The modems listed by Stuehrk included a 2,400 bit/sec "remake" of the 201B, to be designated the 201C and scheduled for the third quarter of 1973.

Also mentioned were a higher-speed 9,600 bit/sec data set, reportedly to be designated the 209, and a modified 202-type modem. And current AT&T

specifications show a dial-up version of the 4,800 bit/sec 208 data set to be designated the 208B and scheduled for delivery in the third quarter of 1973.

When AT&T introduces its 9,600 bit/sec data set, it will also support the Stuehrk data speed as a service offering, Stuehrk said. Users who now transmit at 9,600 bit/sec on the dial-up network with independent modems often encounter service support problems from their local phone companies. But a Dataphone 9600

With possible FCC approval of the Bell DDS application by June 1, 1973, installation of equipment between New York and Boston will "commence immediately" to meet the projected start-up date of January, Steuhrk said. Initial service will be for private-line point-to-point users, but multipoint capability will be added in late 1974 and "a switched digital version is under study."

The proposed alternative for Telpak bulk rate tariffs was mentioned by F.F. Stoddard, AT&T's marketing director for private-line services. The offering would be called "Hi Pak" and would apparently be based on the high-density rate centers included in Bell's recent high-density, low-density revision for its private-line tariffs.

The Hi Pak would "use the basic rate structure" from the high/low plan and would "confine Telpak-like cross-sections

primarily to the high-density network," Stoddard said.

In a related remark during an AT&T presentation at ICA, a Bell official said the company was looking at Telpak "to de-average the rates," possibly "by the end of this summer."

The announced 370 high-density rate centers apparently will be expanded, Stuehrk said, estimating that about five to six per year would be added.

Intertel Has Modems For Bell 103F Users

BURLINGTON, Mass. — A pair of integral modems which provide full Bell 103F-compatible operation at speeds up to 300 bit/sec over two-wire private lines has been introduced by Interphase Inc.

The Model 1038 is an Originate mode unit, while the Model 1039 operates in the Answer mode. Standard features in both models include full duplex operations on unconditioned Type 3002 two-wire private lines. Either model can also be operated on the DDD network when connected to a Bell CDT Data Access Arrangement (DAA). Deliveries are now being made from 6 Vine Brook Park. 01803.



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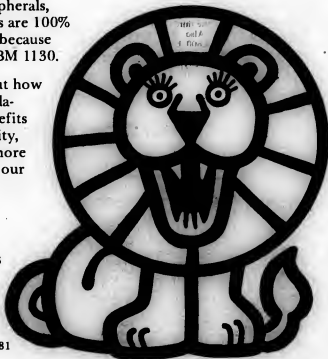
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Teller System Based on LSI Processor

Detroit, Mich. — Burroughs has introduced a processor-oriented terminal system designed for banking and financial users.

The DC 140 is an LSI processor which provides operating and control logic for a variety of teller and administrative terminals. The processor is part of the TCS 1000 terminal computer system which can operate at remote sites connected on-line to a central mainframe.

The TU 700 teller terminal is part of the TCS 1000 system and can be used for teller window passbook and similar banking applications. The TU 700 has automatic passbook reading and includes both numeric and alphanumeric keyboards. The earlier TU 500 for cash and audit control will also operate with the TCS 1000 system.

The DC 140 is a Cobot-oriented CPU that is a modification of the TC 3500 Burroughs system. It has a maximum storage capacity of 64K characters and can be configured in modular memory increments from 4K to 44K characters

depending on terminal system configuration. The processor has two data communications channels that can transmit simultaneously from remote terminals and the main CPU.

Both the TU 500 and the TU 700 can read magnetic stripe coded cards for electronic funds transfer systems. The DC 140 can also be used to control TD 700 and TD 800 inquiry display terminals, RT 2000 cash dispensers and RT 4000 remote teller systems.

Peripherals available for the TCS 1000 system include 90- and 180 line/min printers, 80- and 96-column card equipment, magnetic tape and punched paper tape units.

A typical TCS 1000 system including five TC 700s and 10 TC 500s with DC 140 will cost about \$6,000/terminal using numeric-only terminals, a spokesman said. A system of three alphanumeric TC 700s with a DC 140 will cost about \$10,000/terminal. First deliveries are scheduled for the fourth quarter of 1973.

'Savings to \$8,000/Yr'

Display System IBM-Compatible

By Patrick G. Ward
Of the CW staff

BETHLEH, Conn. — Computer Optics, Inc. has introduced an information display system that is plug-to-plug compatible and software interchangeable with IBM's 3270 display system.

The firm said the CO:77 provides the user with cost reductions and performance advantages over the IBM 3270.

User savings are in direct proportion to the number of displays in the user's total system, according to Computer Optics. The firm stated "user savings can range from \$2,000/yr on an existing 8-station system, to over \$8,000/yr on a typical 16-station configuration."

The CO:77 can be ordered in complete terminal systems or as modules for incorporation into existing systems.

The system includes a display station with a desk-top video display module and movable keyboard, plus a control unit. The CO:77 display station is offered in

480-, 960- and 1,920 char./screen sizes, the smallest unit having 40 char./line and the larger two, 80 char./line. The "dual case option" offers both upper and lower case characters on the largest screen.

Computer Optics is also offering a separately priced character printer and line printer with the CO:77. The character printer provides upper and lower case at 30 char./sec on a 132-char. line.

The page printer transfers an entire screen image in an 8-1/2 in. by 11 in. sheet of paper.

No prices were available from the firm. The CO:77 system will be available for delivery in the fourth quarter of this year. Computer Optics is at Berkshire Industrial Park, 06581.

Data Briefs

GTE Modifies Data Set

SA CARLOS, Calif. — GTE Lenkurt has announced modifications to its type 26D data set.

The firm said changes to the 4,800 bit/sec modem include advanced recovery and synchronization circuitry for phase control. The development of a switchable compromise equalizer and automatic carrier phase adjustment circuitry has simplified both prequalification and post-qualification of data networks, according to the firm.

The 26D costs \$2,700 from 1105 County Road, 94070.

Terminals Convert to Telex

HAUPPAUGE, N.Y. — Multiplex Communications Inc. is offering an adapter to convert terminals to the Telex network. The firm said its CU 300 interface package will enable the use of any five-level teletypewriter or other terminal on the Telex network.

The adapter contains an operator control panel with a rotary dial, sonalnet and operating switch indicators, plus a line interface.

Price of the CU 300 is \$133 in OEM quantities. Delivery is 90 days from 123 Marcus Blvd., 11787.

Converter Translates Ascii Baudot

ITASCAS, Ill. — Nationwide Electronic Systems has a code converter that translates 8-level Ascii tapes to 5-level Baudot output.

Along with the new CC 1038MR code converter, Nationwide offers the CC 1035MR, which converts 5-level tapes to serial 8-level Ascii.

The code converters include mechanical tape reader, all translating circuitry and an output circuit for constant current.

The converters can drive tape perforators, teletypewriters or communication systems.

Price for either model is \$1,845 with a four to six week delivery from 7N662 Route 53, 60143.

Device Switches, Monitors Data Set

PROVIDENCE, R.I. — International Data Sciences, Inc. is offering its Model 8501 data patching and monitoring module that allows the user to switch, patch and monitor all 25 leads of the EIA data interface.

The 8501 displays transmit data, receive data and data carrier detect signals through LED indicators.

When the unit's front-panel switch is in the normal position, the interface appears on a front-panel EIA connector for monitoring.

In patch position, the normal connections are broken and the leads from the rear-mounted connectors are transferred to the front panel for testing, or for channel-to-channel patching.

The Model 8501 costs \$145 with immediate delivery from 100 Nashua Street, 02904.

If your company has an IBM 370 computer system on order or is considering ordering one in the near future, explore the leasing terms available from DPF.

Consider what DPF Inc., the largest independent System 360 computer lessor in the United States, can do for you: Time-Tailored Leases. DPF offers both short-term (as short as three years) operating leases and long-term (as long as ten years) full-payout leases. We help you choose the term that best fits your requirements. Flexibility. All DPF leases contain provisions which permit you to change your arrangement should your data processing requirements change at any time during the term of the lease.

Full Service. DPF doesn't forget you once your hardware is in place. From its vast resources and experience (almost a quarter of a billion dollars of 360 computer inventory presently installed) DPF provides you with continuing hardware and software support throughout the term of your lease.

Peripherals, Too. DPF leases cover your complete data processing system, including non-IBM peripherals you may select. Competitive Costs. Compare the cost of leasing 370 equipment from DPF with any other figures you may have. You'll be delighted.

So, you see, the short-term operating lease did not die with the advent of the 370. It is alive

and well at DPF. Why not get the full details by contacting Mike Swords, our National 370 Sales Manager at Hartsdale, or one of our five Regional Managers: Bill Drew, Chicago, (312) 297-4620; Mac McDaniel, Houston, (713) 783-5641; Harry Carr, Los Angeles, (213) 641-5370; Tony Pintauro, New York, (212) 688-7601; Bill McDermott, Washington, (202) 833-2065.

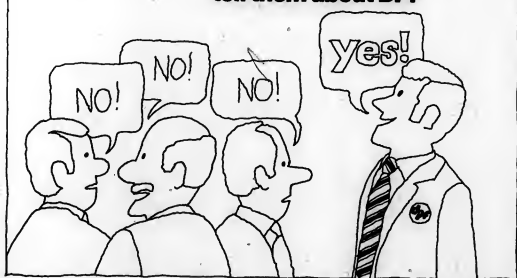
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■ APRIL 1972: Performance Enhancements and Six Partition Support

PERFORMANCE

Users throughout the world are experiencing overall throughput improvements of 25% from the Basic EDOS package alone. Features such as Blocked Fetch, Resident Transients, CPU Load Balancing, and the Fast Linkage Editor are included in Basic EDOS.

OPERATIONAL EASE

Features such as Automatic Volume Sensing, Program Relocation, Dump/Restore, and the flexible Procedure Library simplify the operational environment.

COMPATIBILITY

EDOS is 100% compatible with DOS. All IBM distributed

programs and all user written programs operate without modification. No changes to JCL, data files, programs are required.

SIX PARTITIONS

Provides twice the partition availability. It is like having another C.P.U. Run whatever you want in any partition.

■ JANUARY 1973: Extended Spooling

PERFORMANCE

The fundamental design criteria for Extended Spooling was superior performance. To achieve this goal, this facility was integrated into the EDOS nucleus, not added-on as additional overhead in the form of a sub-system. The management of both main memory and DASD space is automatically performed to insure maximum performance. EDOS Extended Spooling gives a new dimension to the term performance. Performance of up to 50% improved throughput over any other spooling system available.

MINIMUM MAIN MEMORY

The integrated design of Extended Spooling avoids duplication which minimizes main memory requirements.

- 2K Resident Main Memory
- 2K per Device—Dynamically Loaded When in Use
- As many pseudo devices as required without charge

DYNAMIC DASD MANAGEMENT

Extended spooling requires ONE-HALF the disk space required by other Spooling systems. Extended Spooling DASD Management features include:

- Complete Record Compression

- Shared Buffer Area
- Dynamic Space Allocation
- Early Start Facility
- Generic Queues

OPERATOR FEATURES

Extended Spooling functions automatically without operator intervention. A host of operator control and flexibility features include:

- Automatic Device Assignment
- Cascading Abbreviations
- Variable Number of Tasks
- Interrupt Driven Utility
- Automatic Warm Start
- Full I/O Accounting
- Dynamic Output Buffering

■ JUNE 1973: 360/370 Compatibility

The 360/370 compatibility facility provides the complete 370 instruction set for the 360. Run any 370 program on the

360. The data processing industry's 370 development effort is now available to the 360 user! New compilers, sorts, application

programs that are written only for the 370 can now be run on your 360.

EDOS is...Support...Inexpensive

EDOS is a continuing series of system releases offering coordinated extensions to DOS providing improved performance and operational characteristics. EDOS was developed under the direction of Jerry Enfield, the co-author of the Compatibility Operating System (COS), which has been used by over 4,000 360 users.

SUPPORT

EDOS is continuing systems software support for the 360 user: EDOS users continue to

receive without charge complete maintenance. Continuing support not only in terms of maintenance, but a continuous development plan of powerful extensions, such as have occurred during the past year.

INEXPENSIVE

EDOS is inexpensive. With all of the features and performance that EDOS provides, its compatibility and ease of installation, you will want to evaluate it in your own installation. We frankly believe you will agree that EDOS is the

most exciting systems software available. A 60 day free evaluation period is provided. In lieu of the 60 day free evaluation period The Computer Company will install EDOS on your system without charge. The Basic System Release 6 of EDOS has a lease price of \$225.00 per month. Six Partition Support has a monthly lease of \$75.00; Extended Spooling has a monthly lease price of \$200.00.



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SYSTEMS&PERIPHERALS

Bits & Pieces

HP Calculator Accepts Marked/Punch Cards

PALO ALTO, Calif. — Hewlett-Packard has a card reader that enables users of the HP 9800 programmable calculator to use marked and/or punched cards as a data entry medium.

The Model 9869A Calculator Card Reader reads 128-character Hollerith code and converts it to 7-bit ASCII for input to the programmable calculator.

Marks, punched holes or even pre-printed marks can be randomly intermixed. Cards in either 40- or 80-column format can be read. Cards without clock marks can be read using an encoder option.

Cost of the card reader is \$2,775. Options available include: 500-card hopper, \$25; reject/select hopper, \$200; encoder for cards without clock tracks, \$200; and a belt, \$50.

Deliveries are scheduled to begin in June from 1501 Page Mill Road, 94304.

Floppy Disk Attaches to Minis

BEDFORD, Mass. — Innovex Corp. has an interface which connects the firm's "dikette" (floppy disk) moving-head memory subsystem to PDP-8 and PDP-11 minicomputers.

Mounted in the diskette formatter cabinet, a single interface card will handle up to eight floppy disk drives.

The interface contains all the control registers, disk address register, memory register, formatter control sequencing logic and interrupt control needed for disk control, a spokesman said.

The interface bought separately costs \$200. A complete floppy disk subsystem ready to plug into a PDP-8 or PDP-11 is priced at \$2,740 from Four Allied Circle, 01730.

Add-On Unveiled for DDP-516

SUNNYVALE, Calif. — Advanced Memory Systems (AMS) has announced a series of plug-compatible solid-state main memories for Honeywell's DDP-516 line of computers.

Access time for the AMS memory is 425 nsec and cycle time is 980 nsec.

The basic 4K bytes can be expanded linearly to 16K bytes with the HIS DDP-516 system enclosure, through an "add-on" memory storage board that requires no additional power supply modification, the firm's spokesman stated.

Expansion beyond 16K bytes — up to 64K bytes — can be configured by AMS on special order, still within the basic system cabinet, he added.

Price is dependent on memory capacity, but is said to be less than the core memory replaced.

AMS headquarters is located at 1276 Hammerwood Ave., 94086.

Resembles Standard Copier

Xerox Printer Accepts Tape, CPU Input

By Michael Weinstein

Of the CW Staff

NEW YORK, N.Y. — Xerox has combined its copier and computer efforts into a single non-impact "xerographic" computer printing system.

The 1200 resembles the standard Xerox copier on the printing operation and is available in two versions. An off-line model prints from industry-compatible magnetic tapes, while an on-line model operates as a peripheral to the Xerox Sigma 6, Sigma 7 or Sigma 9 computer system.

The 1200 uses the same kind of paper as the firm's copiers — unensitized 8-1/2 in. by 11 in. paper — and prints at speeds up to 4,000 line/min.

This corresponds to a throughput of over one page/sec, according to a Xerox spokesman, which is about twice as fast

as a standard impact-type printer, he added.

An additional feature of the 1200 is its



Xerox 1200 printing system produces copies of computer-generated information on unensitized 8-1/2 in. by 11 in. paper.

Package Lease Plan Combines DAT Box, MOS Memory for 155

SAN FRANCISCO — Intel is offering its 1200/155 users a package lease plan which combines Intel's semiconductor memory with IBM's Dynamic Address Translation (DAT) box. The result, according to Intel, will be to transform the 155 into a working equivalent of the virtual 1200/158.

The semiconductor portion of the package is a monolithic (MOS) main memory with a read and write time of 690 nsec.

This MOS memory is a reworked version of Intel's semiconductor memory modules for the 155. But in the earlier models the cycle time was clocked down, according

to an Intel spokesman, to be identical with the IBM-supplied core memory — 2.1 μ sec storage cycle.

The second portion of the package — the DAT box — will be the standard IBM unit which IBM expects to be ready for delivery in June or July on a purchase-only basis for \$200,000. To make the package, Intel will obtain these units from IBM and IBM will assume responsibility for maintenance of the boxes, while Intel remains responsible for supporting the MOS memory.

While there are no 155s with DAT boxes in the field, an Intel spokesman stated the supercharged 155 would operate at least as efficiently as a standard virtual 158, and in many cases the converted 155 might outperform the latter IBM machine, he said.

The 155/PSU (processor speed-up) memory will be made available in configurations of one to 4M bytes.

For users who don't want the virtual capabilities of the DAT box, the MOS add-on can be obtained separately to replace the standard 155 core memory. In these cases, the spokesman asserted, system performance will be improved from 20% to 50% over standard core.

Prices for the new memory are 10% to 30% higher than those for the earlier Intel 155 memories and about equal to the cost for standard IBM core.

Lease prices for the package deal vary depending on the amount of memory ordered and the duration of the contract. However, 1M byte of Intel 155/PSU and the IBM DAT box will lease for about \$8,000/mo on a five-year lease from One Embarcadero Center, 94111. Deliveries are expected to begin in November 1973.

ability to use preprinted paper stock so that fixed-format information can be copied simultaneously with variable tape- or computer-generated data.

By using a copy-type of operation, users can print an unlimited number of copies, the spokesman said, eliminating the need for multiple passes on the computer. This contrasts with standard impact printers which are limited to a maximum of an original and five carbon copies, he added.

Modified Ascii Set

The 1200 uses a modified Ascii character set of 95 upper- and lower-case characters.

The off-line unit will accept data from any 800- or 1,600 bit/in., 9-track magnetic tape that conforms to either Anal, IBM OS/360 or DOS/360, or Xerox tape formats.

The on-line version operates as a standard Xerox Sigma computer peripheral under control of the Xerox Control Program-Five (CCP-V) virtual memory operating system.

Initial deliveries of the off-line model are scheduled for the fourth quarter of 1973. The computer-driven version is scheduled for delivery in the first quarter of 1974.

The stand-alone model, including magnetic tape input unit, leases for a minimum of \$2,600/mo. The computer-driven system leases for a minimum of \$2,100/mo.

Decision Data Has 5-Year Purchase Plan For S/3 Peripherals

HORSHAM, Pa. — A deferred payment purchase plan permits IBM System/3 users to buy data preparation equipment for about the same amount of money as it would cost to rent the equipment for five years, according to Decision Data Computer Corp.

Under the new plan, System/3 users pay an initial down payment with the balance of the purchase price paid in monthly installments over the five year period. For existing lease contracts, up to 70% of the monthly rental may be credited against purchase price.

The purchase monthly payments, which include maintenance costs, are lower than the monthly charges under either of the firm's present rental programs, a spokesman said.

After the five-year period, the only user costs are those for monthly maintenance.

Card equipment covered in this offering are the Data Recorder, Interpreting Data Recorder, AlphaNumeric Sorter and Sorting Data Recorder.

Decision Data is located at 100 Witmer Road, 19044.

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variety of type styles, including foreign languages. A single cartridge can accept the cartridge, 96 characters, 96 characters. Over 100,000 Hy-Tex cartridges already been shipped, all giving the trouble-free performance you've come to expect from Hy-Tex products. The only inkjet truly a prize among printers. For more information, write or call Diablos Systems, Inc., 24500 Industrial Boulevard, Hayward, Calif. 94545-415 783-3910.

Diablo

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Here's good news for DOS 360/370 users!

GRASP - the other half of your operating system.



GRASP is the most effective DOS systems software available today. It's providing dramatic dollar savings to over a thousand installations around the world. Here are some of the reasons why.

WRAPAROUND SPOOLING: Faster than IBM spooling and much easier to install and operate. Requires much less core and disk space.

COMPLETE JOB ACCOUNTING: Consumes about one percent of CPU time for accounting. IBM's uses about ten percent. Statistics collected are far more meaningful and comprehensive.

SELF-RELOCATABILITY: One copy of all programs means reduced maintenance costs, reduced disk requirements

for libraries. Speeds execution of overlaid programs—like SORT.

PARTITION BALANCING: A completely transparent priority dispatcher that increases throughput 8 to 12 percent per partition.

FOURTH PARTITION: Adds a complete, storage protected partition for GRASP's residence. IBM spooling takes one of DOS' partitions.

AUTOMATIC VOLUME RECOGNITION: More usability for tapes and disk. More fluid multi-programming.

RESIDENT TRANSIENTS: Especially for the ISAM user, phenomenal reductions in run times.

PCI FETCH—CATALOGUED PROCEDURES—TAPE SPOOLING—are among many more time and dollar saving features of GRASP.

GRASP can be installed in just 15 minutes, with no change to existing programs or procedures. The savings start immediately.

GRASP is a product of Software Design, Inc., the performance leaders in DOS systems software, and supported by a worldwide organization of specialists whose only business is DOS systems software. Send for your GRASP button today, and the other half of your operating system.

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SDI

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Burlingame, California 94010

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Burlingame, Calif. 94010

Please have an SDI representative show me how the GRASP button will give me the other half of my operating system.

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Title _____
Company _____
Address _____
City _____
State _____ Zip _____
Telephone _____
We have 360/370 Model _____

Word Recognition System

Voice Data Entry Gives Quality Inspectors a Hand

PITTSBURGH, Pa. — Quality inspectors at Owens-Illinois Corp. are using a Voice Data Encoding System (VDES) for data entry of quality control measurements.

As the inspector measures each component he speaks his findings into a headset microphone. From this vocal input a monitor displays the input data so the inspector can verify it or see if the measurement is out of tolerance.

If the displayed data is correct — i.e., exactly as he voiced it — he uses the control word, "go," which directs the system to input that data to a central processor.

If the information is incorrect, he speaks a control word and his measurement. The retry is overlaid in the buffer area with the newer vocal input figures displayed on the screen of the visual display unit.

Heart of the VDES, developed by Threshold Technology Inc., is a word recognition system that analyzes and compares words as they are entered by comparing them with referenced samples stored in the system.

System Trained

Samples are introduced during a training period, in which each inspector who will be using the system repeats each command in the system's vocabulary ten times.

When a production floor inspection entry is later made by that particular inspector, the stored reference sample most closely matching the incoming command is selected as the proper response and is visually displayed on the front panel as numerical output.

Mark II Controller Protects Systems During Power Loss

SAUGERTIES, N.Y. — FX Systems Corp. has introduced a programmable controller system, called the Mark II, Un-Computer, Series 700.

The unit is designed to protect against failure or other interruption, and a power-failure guard circuit insures completion of the step being performed despite loss of power, the firm said. Protective circuitry transfers control to a shut-down routine that preserve all program and operating data, halts processing and returns to a logical point in the control cycle for restart when normal processing is possible.

SCL-10 Language

The programming language used is called SCL-10 and employs English-language instructions. Relay logic is programmed and entered through a teletypewriter.

The basic controller costs \$2,950, including rack and front panel, wiring to accept six optional I/O interface cards and priority interrupter with arithmetic logic. The power supply is an option at an additional \$400. Delivery is three months from Mount Marion Road, 12477.

Test Station Provides On-Line Diagnostics

ANN ARBOR, Mich. — An expanded test station is in operation at Sparco Inc. headquarters to provide the firm's field engineering representatives on-line answers to user's hardware communications problems.

The custom-designed test station uses a digital switching device to duplicate customer terminal communications networks and is capable of communicating in Ascii, Ebclic, Baudot and binary synchronous modes from 1,200 to 2,400 bit/sec. Asynchronous transmission is from 37.5 to 1,200 bit/sec.

After a voice verification that the displayed data is correct, the computerized data is retained along with descriptive information such as the measurement category associated with the voice input.

This information when combined with the inspectors audio measurement data describes any one piece being inspected. Later the same input forms the basis of a report or can cause an alarm to sound if a piece is out of acceptable tolerance range.

In a typical operation a standard teletypewriter provides the hard-copy output for the reports. The TTY's standard functions are to provide manual control, entry of heading information, a final report and corresponding paper tape containing inspection data.

Day in the Life

In a typical day of operation at Owens-Illinois, the quality inspector comes to duty and goes to the teletypewriter —

perhaps located in a separate room with supplies and accessory equipment.

He begins by directing the system to activate a program for use with a given type of equipment — in this case television tubes.

A run of up to 11 samples is begun by entering on the TTY keyboard the heading, containing item code data, shift, time, name of inspector, name of the foreman, plunger, survey number and shop.

The system is now ready to accept spoken data from the inspector with a maximum of five digits and positive or negative sign entered for each measurement.

As each entry is made, it is compared to any applicable tolerance limit previously stored. If a measurement is "out of tolerance" a lamp is lit on the display and the value is typed out along with the sample number and data category. This allows the operator to check the measure-



Inspector measures the width of a television tube, entering the result through his headset.

Threshold Technology is located at Route 130 and Union Landing Road, Cinnaminson, N.J. 08077.



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Us. Anybody who says they can do all this is worth talking to. Call Ron Doiron at (714) 778-4800. Or write him in care of General Automation, Inc., 1055 S. East St., Anaheim, Calif. 92805.

GENERAL AUTOMATION 18/30 DMS

See DMS in Booth 2201 at the National Computer Conference.

OEM Products

While equipment in this column is primarily for Original Equipment Manufacturers (OEMs), in most cases it is also available in single units to interested users. Further, while some of this equipment is not presently available to the end user, it does give some indication of techniques and products that may be incorporated into end-user equipment.

Floppy Disk Memory System Designed With Fixed Heads

BOULDER, Colo. — A "floppy" disk memory system designed with fixed heads that fly above the floppy disk surface is available from Intelligent Memory Systems, Inc.

The MU/104 series is available in three models: the MU/104 — cartridge only; the MU/108 — cartridge plus 16 Kbytes on the fixed disk; and the MU/112 — cartridge plus 32 Kbytes on the fixed disk.

All models are designed for 130 bytes/sector, have an average access time of 16.7 msec, and have a data transfer rate of 1.06 Mbit/sec.

Prices without interfacing range from \$760 single unit price to about \$500 in OEM quantities for the MU/104 from 5721 Arapahoe Ave., 80303.

Build Your Own Mini

NATICK, Mass. — A build-yourself minicomputer system is available from Control Logic, Inc.

A minimum LSI/MOS based system sells for under \$400 and consists of an 8-bit processor, I/O control and memory address buffer.

Other L Series modules include a 512 by 8-bit Prom, 256 by 8-bit RAM, Universal Asynchronous Receiver/Transmitter.

Prices of modules range from \$30 to \$325 from Nine Tech Circle, 01760.

Tape System for Digital Use

HIGHLAND PARK, Ill. — Data Specialties has announced a tape perforator system designed for applications such as recording the output of digital instruments.

The PER-820 operates at 20 char./sec. asynchronously. The unit accepts logic level input signals.

Cost is \$1,050 from 1548 Old Skokie Road, 60025.

Sweep Generator Uses LED

SAN DIEGO — Wavetek is offering a sweep generator with a front-panel LED digital display that shows the frequency and positive/negative peak voltages of the output signal with 3-digit resolution, a spokesman said.

The Model 147 is a .0005 Hz to 10 MHz source of sine, triangle, square, positive pulse and negative pulse waveforms, each with variable amplitude, dc offset and symmetry, the spokesman said.

Price of the 147 is \$1,295 from P.O. Box 651, 92112.

ROM DTL/TTL-Compatible

SUNNYVALE, Calif. — Monolithic Memories, Inc. has announced its MM5280/6280 ROM with 8K-bit storage.

Access time for the 8K ROM is 150 msec maximum, with power dissipation of 50 μ W/bit. It is DTL/TTL-compatible with I/O of standard TTL input load and open collector output.

The price of the MM6280 is \$55 in lots of 100 from 1165 E. Arques Ave., 94086.

Raster Graphic System Displays Black/White And Color Images

SUNNYVALE, Calif. — Ramtek Corp. has introduced a solid state, raster graphic system with capabilities for color, grey scale or black and white.

Capabilities of the GX-1000 include alphanumeric generation, graphic plotting, artesian graphics, selectable erase and reverse background. These capabilities are accomplished within the system controller resulting in reduced software requirements and reduced computer time load, a spokesman said.

Resolutions are 256 elements by 256 lines and 512 elements by 256 lines. All points are addressable and 26 applications



Screen displays output provided by the GX-1000.

combinations are possible, he added.

The system is priced — in OEM quantities — at about \$4500 per channel for grey scale or color, and about \$1500 per channel for black and white graphics from 292 Commercial St., 94086.

Cassette Recorder Has Variable Speeds

PASADENA, Calif. — A digital cassette tape recorder for use in data gathering and processing systems has been announced by Bell & Howell's Electronics & Instruments Group.

Available in single and dual-track models, the recorder uses standard Philips-type cassettes with digital grade tape. Any operating speed between 2 and 20 in./sec. may be selected.

The unit operates in incremental or continuous modes, and in several combinations of recording codes and data channel selections.

The recorder sells for \$360 in OEM quantities of 51 to 100 from 360 Sierra Madre Villa Ave., 91109.



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COPE 85 can simultaneously interface with up to three IBM 360/370's, CDC 6000's, Univac 1100's or combinations of these under their normal operating systems. Various bi-sync, 1004 and 200 UT protocols can be accommodated at speeds from 2KB to 50 KB.

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COPE portable conversational keyboard terminals are alternatives for IBM 2740 and 2741 and operate at speeds up to 15 cps for both on- and off-line applications.

5. COPE 4705 Communications Controller

Larger Memories Coming

Trial Papers Imply IBM Withholds 135 Enhancements

By E. Drake Lundell Jr.
or the CW Staff

TULSA, Okla. — The first announcement of the 370/135 "did not include many key elements of the total system package," secret IBM documents revealed here in the Telex antitrust suit against IBM.

"These follow-on items were left for later announcements either for strategic purposes or lack of currently available resources," according to the Model 135 "Greybook," a financial analysis of the expected product

performance.

Under the memory upgrade plan users will be able to upgrade their memory on the 135 from the present 240K maximum to either 368K or 496K, according to the documents. But the memory upgrade is just part of an entire package of enhancements planned for the 135 this year, according to the IBM papers.

Several of the enhancements, it noted, were dependent on groups outside the Data Process-

ing Division, most notably the Components Division, which was then developing a memory known to IBM as "FET-CP" to be used in later versions of the 135.

This memory, the document said, was intended to be four times as dense as the memory announced with the 135 and would offer "two distinct advantages" when used with the 135.

First, the Greybook said, "Its density would enable considerably more than 240K of

memory to fit under the covers of the CPU." Since it was IBM's intention to provide more memory for the 135 than the original maximum of 240K, it was important to have the extra memory under the cover. It would be less vulnerable to replacement there than in a separate box, as would have been required if the firm had used the original 135 memory to upgrade the capacity.

The second reason the development of this new memory was important to IBM was "its low

cost would provide" between \$30 million and \$40 million in cost savings, since the firm planned to use the new memory in all 135s after December 1973.

Additional Enhancements

In addition, there will also be an integrated bus adapter (see attachment) for the Winchester disk units, a scientific accelerator for the unit and a real-time channel/priority interrupt feature for the system.

All these features are expected to be available for first customer deliveries by the end of this year unless the IBM development plans slip, according to the documents. Apparently the announcement plans have already slipped since they were due late last year.

One project that has already been canceled by IBM was to be a new operating system for the 135s and 145s known internally as Leos. This project has been shelved, apparently permanently, but no reasons were given.

Surprisingly, although the 135 Greybook devotes a great deal of time explaining the advantages of AOS-1, which became VS-1 for the 135 users, the IBM projections indicate they do not really expect many users to go to it for their operating system—even if it is used as the major sales tool for the system.

The peak year for the use of VS-1 among the 135 users is seen to be 1976, when 12% of the users will have it installed. However at that time, IBM expects most of the users (87%) to be using DOSE (DOS extensions). At present most users, according to the projections, should be shifting from straight DOS to the DOSE package.

The major purpose of the 135 was to provide a migration path for the 360/25 and 30 users, according to the document. It noted that 360/25 users should be willing to pay the 24% to 43% increase in price to get the additional features and higher speeds, while the typical 360/30 users were expected to pay between 15% and 29% more to make the upgrade.

"Such increases should not be difficult to sell unless the customer is strictly price conscious and has no requirements for throughput performance," the Greybook asserted.

The IBM planners were worried when the 135 was announced the other mainframe makers might come up with some new systems that would compete heavily against the 135.

But a few months later they could confidently say, "Most of the anticipated competitive announcements did not turn out to be as dramatic as expected." Ironically, the planners noted the RCA-2 system came closest to the 135 on a performance comparison. "However, it was not as price-competitive as had been expected."

Overall the IBM planners could note the 135 should be a "marketing and financial success for IBM." And they indicated that over its pricing life of 48 months the system should return a profit of \$5.6 billion worldwide, or around 30%.

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Called Expensive 'Prima Donnas'

Dim Future Painted for Programmers; Clerk Role Seen

By Joseph Hanlon

Special to Computerworld

NOTTINGHAM, England — User programmers have no future — their jobs are disappearing and their promotion prospects are almost nil. Within a few years, the remaining user programmers will have jobs comparable to that of a bank clerk, with most of the traditional responsibilities split between operators and systems analysts.

These conclusions were drawn from three papers given at the Datafair conference here last month.

Datafair is the biennial conference of the British Computer Society. Attendance was estimated at 5,000, down more than 2,000 from 1971 figures.

Career development from computing positions to general management is a myth — programmers may become DP managers, but they won't move into general management, IBM consultant systems

engineer Brian R. Edwards told the Datafair attendees.

Three arguments were cited as necessary for career progression: the high IQ of the

There are really only two ways for a DP'er to have career prospects: "Take the risk of leaving computing and breaking into one of the main line areas, such as marketing or production, or move to an organization which is dedicated to computing."

computer community, its widespread knowledge of the organization and its power. Edwards then explained why none of these factors actually works.

IQ, controlled through programmer aptitude tests, has no correlation with management ability, he said.

DP managers tend to be concerned with "improving mechanistic aspects of a department's work," and look to the internal system rather than to customers, suppliers, etc. Line managers, on the other hand, "are primarily concerned with the non-mechanistic aspects" and must look outside. So the DP manager largely has training in the "wrong part of the business."

As for power, Edwards stated, the "DP manager is vital as a provider of a service, but he is nowhere near usurping the functions of those whom he serves." He is powerful only in the negative sense that he can stop the organization.

Management information systems may ease the problems, but only if the DP manager dedicates himself to building a system to actually serve the chief executive, Edwards suggested. The DP manager then enhances the significance, value and power of his job.

"The best advice to the ambitious computing man who seeks to exercise 'general management' is to develop the DP function in his organization that he becomes the DP manager of the chief executive's control system," Edwards said. Failure to do this may indicate a lack of ability for general management positions.

But this route seems open to very few DP managers. Edwards cited one of his studies that showed "few DP managers ever reach general management. Nearly all of those who do are either people with significant experience prior to DP, or people with assignments in companies where DP is the business."

This means, he explained, that there really are only two ways for a DP'er to have career prospects: "Take the risk of leaving computing and breaking into one of the main line areas, such as marketing or production, or move to an organization which is dedicated to computing."

Job Disappearing

This advice is good for another reason — the job of the user programmer is disappearing, but its passing should be encouraged, according to David Willingham, senior consultant for Management Dynamics Software Services.

"The user programmer is being reduced to the level of a coder and program tester," Willingham asserted. This has happened because "part of his job is being performed by the systems analyst who often descends to considerable depths of detail," largely because the introduction of modular programming means that objectives can be translated to software without a "knowledge of detailed programming tricks."

Another part of the programmer's job has been taken over by the operator, who has risen "from a mere button pusher to somebody who is essential to the efficient running of the large, complex systems that we favor these days" and who is now "often responsible" for library maintenance, reprogramming and recognition of bugs.

Program generators and software packages have also reduced the need for programmers, aided by the increasing compatibility both of ranges and of different manufacturers' machines, Willingham declared.

In a few years, virtually all remaining programmers will be with software houses and manufacturers. And DP managers are sure to encourage this trend, he argued, because programmers are expensive "prima-donnas" who only "created additional problems."

Middle-Aged Programmers?

And what of the programmers who remain? "One never raises an eyebrow at the middle-aged clerical worker with his civil service image, but the concept of a middle-aged programmer was laughable."

No more, according to Rosemary Sarafian, manager of Computer Personnel International. Programmers now must expect to do "the same job month after month just as white collar workers do, enjoying a professional status with few promotional rewards."

Sarafian, in essence, supported Willingham's view of the programmer's future: "a programmer will gradually have less and less responsibility" and the job will be comparable to that of a bank clerk.

Car Pools Catching On

PASADENA, Calif. — A two-year-old car pool program at a Burroughs Corp. facility here has cut parking space needs by 30%, the firm said. Since parking space shortages spur many employers to promote car pools, Burroughs is making its car pool computer program available to interested employers through "Operation Oxygen," an environmental organization.

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Market Advice Compiled

Data Bank Aids Home Builders, Sellers

By Patrick G. Ward

Of the CW staff

ANAHEIM, Calif. — For the past three years, Walker & Lee, a sales organization, has been putting data on every home it has sold (some 10,000 a year) into a data bank to aid the firm's salesmen and developers.

Commuters Match Up

ANDOVER, Mass. — Two commuters have planned a computerized car-pool system for traveling into and out of Boston every day.

The basis of Commuter-Match is a list of commuters' names in specific locations, matched by computer, which is supplied to a member for a small initial fee, the planners said.

Armed with the list, the buyer can make his own traveling arrangements.

Data on the home buyer includes income, profession, family size, age and former residence specifications. Data on the homes the firm sells includes specifications such as lot size, number of bedrooms and baths.

Each member of the sales force is coded along with his individual sales to indicate what kind of buyer he functions most effectively with.

To aid developers, George Fulton, director of research and development for the firm, said:

"We look at the demographics of the population segment in question — study the information available from the census department, review population projections, building permit trends and occupancy rates — to determine supply versus demand, both current and potential.

"We can then tell the developer

what type of homes in what price range is most suited to his market, and, if we are going to handle the sales for the project, who in our sales force will function most effectively in that market.

"There are other ways we can use the data," Fulton said. "If we see a large number of \$24,000 to \$28,000 homes on the market, we can ask the computer what kind of homes these sellers are likely to buy.

"If we see a large number of \$24,000 to \$28,000 homes on the market, we can ask the computer what kind of homes these sellers are likely to buy.

"And if we see a high occupancy rate on a given rental base, we ask the computer what kind of a house does that renter typically buy."

DP on TV

AMSTERDAM — It's DP on TV in The Netherlands.

About 8,000 Dutch students have paid a \$46 fee to enroll in a 36-lesson television course in basic computer science that began last September.

One thousand students plan to take an exam supervised by the Dutch Government in addition to their regular course work.

To prepare for the exam, the students meet on eight Saturdays when 30 teachers instruct them.

The students regularly do their homework assignments, a Dutch spokesman reported. Each student puts down his answers to the multiple-choice homework questions on mark-sensing cards. A computer checks the answers, computes each student's average and a class average.

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Perhaps even more important, the Bell System has what is called the Data Technical Support Team.

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that potential and actual failures can be quickly and accurately isolated and the information necessary to correct errors is provided so that interruption is minimized. With our 6360 memory subsystem, for example—when multiple basic storage modules are employed—an error condition can be diagnosed off-line in one unit while the remainder of the memory is still available to the user.

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Secret Documents Reveal

IBM's Pollution Control Efforts Cut Back

TULSA, Okla. — IBM had cut back so deeply to increase profits in 1970 and 1971 that some of its efforts in the pollution control field — a pet project of top management — had been eliminated or slowed down.

Secret documents from the Telus suit against IBM revealed the deficiencies were so serious, the top IBM management committee, the Management Review Committee, was told in March of 1972 that IBM had in fact been in violation of some state and local regulations in the field.

However, on learning of the violations, the Management Review Committee reinforced the IBM commitment to a "pollution-free environment" and told the various parts of the company to expend the necessary resources to meet these goals.

At that meeting, the MRC received a report that indicated "IBM was now operating on a minimum program to meet state, local and federal government requirements. As a result of being so close to the line, we have had intermittent violations."

The minutes add: "The committee expressed some surprise at our lack of leadership in this area in light of their previous understanding that we were totally pollution-free in the sense of, being in compliance with existing regulations, and the current issue was thought to be one of how to move beyond our current position on a prioritized basis."

The Committee also reprimanded the people involved for their failure to bring the matter to its attention and "in light of

the attendant delay, it was deemed more important than ever to move quickly toward attainment of the previously stated goals."

Overall the firm plans to spend \$52.5 million during the 1972 to 1976 time period in order to meet its goal of a totally pollution free manufacturing environment, the minutes show. Of that figure \$7.1 million was slated to be expended in 1972 and \$23.5 million this year.

The committee asked the people involved in the effort if it could be speeded up by the expenditure of more funds earlier in the program, but they were assured that the firm was moving as fast as possible under the revised plan re-emphasizing the commitment to the idea of a pollution-free environment.

MIS Gives Firemen Relief

NEW YORK — A multimillion-dollar computerized management information and control system will provide extensive information for the New York City firemen.

The system will be required to keep constant track of all equipment so fire companies can be moved into unprotected areas if the home company is out for a long time at a multiple-alarm fire. It will also inform the personnel department when a fireman should be rotated out of a busy house because of age or other handicaps, and will provide injury reports.

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Canadian Conference Views Past, Future

EDMONTON, Alta. — The 1973 Canadian Computer Conference, to be held June 20-22, will concentrate on the theme "Focus 20/20."

As keynote speakers, C.C. Gottlieb will review the accomplishments of the last 20 years, and H.J. Von Barneveld will anticipate developments of the next 20 years.

Applications sessions include "ABC — Using computers without programmers," a system which lets non-technical people use computers without the help of programmers by V.W. Ruskin of Stevenson & Kellogg, Ltd.; "some underlying reasons for excessive computer system implementation costs" by J.J. Leppik of IBM; "design considerations

for commercial RJE applications" by D. Hathaway, Placer Development Ltd., Vancouver; and "the Canadian computer network; evaluation, the alternatives using simulation and queuing networks" by D. Selby and M. Alemparte, Department of Computer Science, University of British Columbia.

Software sessions include "controlling

archy design concepts" by M.S. Doyle, University of Manitoba and J.W. Graham, University of Waterloo; "data management in the virtual machine environment" by M.W. O'Reilly and W.D.M. Sawyer of Bell, Northern Research, Ottawa; and "small business systems" by M. Brodie and D. Tschirwitz of the University of Toronto.

Workshop Series

Societies/ User Groups

Concurrent with the main technical sessions, a series of workshops include "features that may humanize or dehumanize an information system" chaired by Dr. Theodor D. Sterling of Simon Fraser University, and "computer control and audit guidelines" chaired by R.J. Roen of Fuller Jenks Associates, management consultants.

The conference is being sponsored by the Canadian Information Processing Society, which can be reached through P.O. Box 1881, Edmonton, Alberta T5J 2P3, Canada.

General Chairman of the program is Paul F. Roth, A265 Technology Bldg., National Bureau of Standards, Washington, D.C. 20234.

Simulation Conference Planned

GAITHERSBURG, Md. — The ACM-Sigsim/NBS Conference on Simulation of Computer Systems, to be held at the National Bureau of Standards June 19-20, will provide a forum for state of the art information in the area of the application of simulation to computer systems' performance prediction.

Dr. Ruth M. Davis will present the welcoming address. The eight sessions of the conference include "languages for computer system modeling," "hardware and software monitors in support of simulation" and "trace-driven modeling."

Registration fee for the conference is \$35 for ACM, Sigsim or NBS staff members, and \$40 for others.

ACM Group Highlights Personnel Research

COLLEGE PARK, Md. — Daniel Freedman of the State University of New York at Binghamton will be the keynote speaker at the Eleventh Annual Computer Personnel Research Conference, sponsored by the ACM Special Interest Group on Computer Personnel Research, to be held at the University of Maryland conference center June 21 and 22.

Seven sessions will cover topics such as "managing computer personnel," by professors Richard L. Nolan and Cyrus Gibson of Harvard University, "research needs for the next decade," by Robert N. Reinstedt of Rand Corp., and "careers for youth in computer occupations, 1971-1976," by Professor John L. Fulmer of the Georgia Institute of Technology.

Friday morning will be devoted to workshops, and in the afternoon there will be panel discussions on the problems of certification.

Registration fees are \$55 for ACM members, \$65 for non-ACM members and \$10 for students.

Program chairman is A.W. Stalnaker, College of Industrial Management, Georgia Institute of Technology, Atlanta, Ga. 30332.

Call for Papers

RENO, Nev. — The National Council of Juvenile Court Judges is soliciting papers for presentation at its meeting in Atlanta Dec. 6-8.

The theme of the meeting will be the status and potential of computers in the juvenile justice system. Emphasis will be on both the theoretical and practical applications in research, administration, and decision making in courts and agencies working with juveniles.

Papers may address problems, solutions, research, requirements, demonstration projects and other categories related to the theme of this symposium.

For additional information, contact: Lawrence A. Boxerman, Project Director, National Council of Juvenile Court Judges, Box 8000, University of Nevada, 89507.

Meeting Focuses On College DP

CLAREMONT, Calif. — The Fourth International Conference on Computers in the Undergraduate Curriculum, co-sponsored by the National Science Foundation (NSF) and The Claremont Colleges, will be held at the Harvey Muir College June 18-20.

The conference will include 16 paper presentations and three panel sessions covering "the role of the computer science department in the use of computers in the undergraduate curriculum," "the pedagogy of undergraduate education," as well as a presentation by NSF's Conduit Group on "procedures for disseminating computer-based curriculum material for the social sciences."

Registration fee is \$40 for educational institution faculty members or government agency members, and \$75 for others. The conference coordinator is Bill Kotoff, The Claremont Colleges, 91711.

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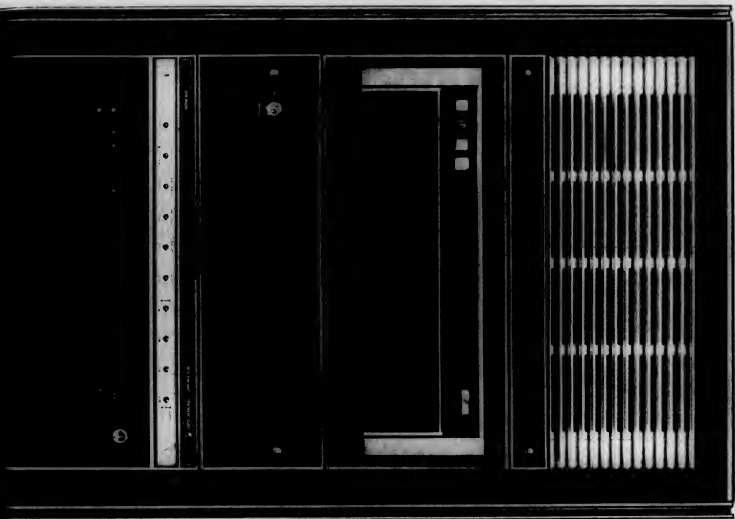
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Long-Range Support Doubtful

Present Programming Systems Had to Be 'Obsolated'

(Continued from Page 1)

System 360 was designed to solve the problem, they said, since the goal of that system was to develop a compatible hardware and software line to bridge the entire IBM product line.

"Unfortunately, this goal was not attained. The hardware succeeded reasonably well in maintaining product line compatibility, while achieving its price/performance objectives," the planners said.

"The software was not so fortunate," they admitted, however. "The state of the art in software simply did not allow the creation of a single programming system that could survive within the space constraints of the small hardware configurations and still provide the sophisticated facilities required by the large-scale community."

Therefore, they said, three systems were developed: DOS for the small-scale user; OS for the larger scale; and TSS/360 to explore the technology of virtual memory.

The System 370 presented new problems because it was designed largely to run the same software. "However, the software must be upgraded to recognize certain hardware anomalies, support the new line of I/O equipment peculiar to the System 370 and to support the extended precision arithmetic hardware."

The addition of virtual memory (or the "relocate" function as it is called internally in IBM with relocate apparently synonymous with dynamic address translation) will lead to fragmented software systems in the 1974 time frame, the planners indicated, noting that TSS/360/370 will still be in use as well as AOS-II (VS-II), OS/360/370, AOS-I (VS-I) and DOS/360/370.

Relocate Unsupported

At the time of the study IBM, they noted, had already abandoned plans to develop the Leos system which would have been a method for supporting relocate on the 145. Without it, they said, "the current programming system plan does not yet address the proper method of supporting relocate on the 370/145."

"This is particularly unfortunate at this time since the 370/145 has the relocated hardware built into it."

The widespread use of many different programming systems, the planners said, presents the same type of problems that were found with the great deal of

hardware incompatibility during the period right before the 360 — except they were in software.

At the same time, they noted, "functional deficiencies exist in the current software systems. Most of these facilities are required by the medium- and large-scale users during the 1970-1974 strategy period; however, the small-scale users are also affected."

OS Inability

The deficiencies, the planners

said, are primarily in the mainstream of the product line — that is OS/360 and its derivatives — and have caused the marketplace potentials of such things as remote computing, data base/data communications and sensor-based application to remain "relatively undeveloped because of the inability of OS/360 to react to these needs in a timely manner."

Even though the operating systems have "struggled manfully with the problem of satisfying current demand," the plan-

ners said that "nonetheless it remains true that it is increasingly expensive to make further additions to them."

"Indeed, it is increasingly expensive to keep them in good repair," the planners noted, claiming that user surveys showed many users would continue to use the outmoded systems through the 1975 time period.

Shape Up!

The continued inability to meet the needs of the market

"will enable our competitors to attack our installed base, and seriously reduce our revenue-generating capability," the planners said.

Because of these factors, the firm put together a team to design the functional requirements for a new system that was to become Q, a combination of hardware and software elements or subsystems designed to meet the user needs of the late 1970s and early 1980s as IBM forecast that at that time.



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Profiles Built To Block Abuse

VANCOUVER, B.C. — The Unemployment Insurance Commission here has instituted computerized "abuser profiles" to help eliminate cheating in the system.

The commission hopes that by breaking down into categories the different types of abusers — such as those who collect checks while on holiday in Europe — it will be able to determine those people who the commission feels are most likely to cheat.

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Extend Features to Non-Programmers

'Q' Must Be Usable by the Public

By E. Droke Lundell Jr.
Of the CW Staff

TULSA, Okla.—One of the major requirements for System Q, as seen by the IBM researchers in 1970, is that it be a "usable" system, not just by programmers, but also by the general public.

This requirement "will have the most profound effect upon the entire system. Every other requirement for System Q will be subordinate to this requirement," the planners agreed.

In addition, they said, "Every function and feature proposed for System Q must be evaluated in this regard to assure the system will not become surrounded by the jargon characterizing the human interfaces today."

"The system must be usable by people who are not programmers, not professionals, not college graduates and not necessarily high school graduates," they said.

Usability must be considered at least on an equal footing with performance by the designers of the system, they added.

The designers also made it clear that the system's goal was to be more useful to programmers and general installation management, the System Q functional specifications showed.

How did the designers plan to accomplish this usability goal?

Extensions Needed

"To meet this objective, extensions must be made in the areas of languages, data handling and system facilities," the designers pointed out.

To extend the features of the system to non-programmers, the study group recommended that "the following language capabilities be provided:

1. A layman's language to facilitate system use.

"2. A general-purpose query update language (a proper subset of the layman's language).

"3. A Common Command Language by which, with equal facility, operators may effectively manage both simple and complex installations.

"4. Language facilities that emphasize simplicity of user, provide inherent tutorial capabilities (e.g., leading by hand, etc.), allow natural subsetting into learner languages and natural extensions for complex applications, etc. for items 1 to 3 above

"5. Facilities to implement occupational or problem-oriented languages designed for specific users or applications and based on industry terminology."

In addition, the system will have several new features to aid the programmer, if the goals of the designers are met by the implementation team even now at work on the project.

Data Independence

First it will have "extensions to current languages to facilitate the implementation of data independence, the identification of parallelism within programs, the variable binding of programs to system resources, and to provide data flexibility to meet user requirements."

Another programmer-oriented feature will be the "expansion of compilers to provide interactive execution for computer-assisted problem-solving, program development and debugging," and "the introduction of all new functions via the primary higher-level languages of the marketplace."

There would also be the "minimization, if not the elimination, of requirement to use lower-level languages for new functions."

In addition, System Q will be designed for "complete compatibility within a language whether it is used in conversational or batch mode," and will have learner languages as proper subsets of the full programming languages offered," the planners said.

"To increase the general usability of a system, it is necessary to eliminate or minimize those artificial constraints on

inherent problems associated with the processing of data," the planners continued.

"To this end, five essential requirements have been established: data independence, variable binding of data to procedures (programs); data migration and interchange; data integrity/security; data journaling and recovery."

In the area of data independence, the planners noted this is a general term for freeing a program from the external conditions upon which it is not logically dependent and found that there were many ways to do this.

"However, the gross market requirement is viewed as separating the application procedures (programs) from the physical data representations, relationships, addresses and ownership," they said.

The requirements call for a system that would be data independent in the areas of data manipulation, data representation and data addressing.

Variable binding, the planners said, "refers to the time at which the logical data and the physical addresses are bound.... The marketplace of the

(Continued on Page 46)

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Programmer, Installation Manager Aids Featured

By E. Drake Lundell Jr.
Of the CW Staff

TULSA, Okla. — The plans for System Q call for the inclusion of special features to aid programmers and to help installation managers configure and manage their systems.

The programming aids will primarily be to help the programmer "in developing facilities for the non-programmer to use."

"This prime emphasis is in the area of improved program debugging tools, including symbolic debugging facilities for applications programmers, a support system which provides for control of program executions during debugging tools, and a systems debugging package for the system control program which can be invoked dynamically as well as statically."

In addition, the planners said environmental dependencies within the system should be transparent to the user such that "changes in the configuration of the systems do not affect previously checked out and properly running programs."

For the installation manager, IBM is planning a whole bagful of useful new tools for the System Q environment.

The first will be aids that help in selecting systems and configurations to "assure the selection of a configuration that is optimal with respect to installation requirements."

To do this, the planners said, "a series of system design tools must be provided to assist the customer in evaluating his system design and operational algorithms so that he can intelligently construct a system to meet his needs."

"These tools must include a set of system performance profiles that identify and quantify the performance characteristics of critical components within the system."

"The performance of these components might be measured and expressed in terms as size of data base, number of accesses per transaction, number of terminals per system, etc."

"In addition, performance might be further delineated in terms of system en-

vironment with separate quantifications for batch, interactive and event driven processing, and for any combinations thereof."

"In this way, it should be possible to determine the impact of one environment on another when they exhibit the same system and share critical resources," the designers said.

Simulation Model Support

To provide this type of information, the planners said the system must be supported by simulation models "which are based upon the figures of merit and properly demonstrate the interrelationship of these performance criteria so it is possible to accurately predict the performance of a given configuration in a given environment."

Input to the simulation models could be either manual descriptions of expected requirements or statistical and trace data collected by the system during the course of actual operation, they said.

In addition, the planners said, after a

system is installed it should have facilities for measuring its performance in actual operation. These measurement tools, they said, should be integrated within the system.

"The system must be capable of maintaining and displaying, on a dynamic basis: its own status and that of tasks, jobs, data sets, etc.; system performance; the utilization of components — hardware (CPU, core, channels, DASD, terminals, etc.); system workload and other statistical information as may be required."

The planners also indicated the new system must have provisions that allow the computer configuration to react dynamically to its environment "so that it remains in concert with installation requirements no matter how rapidly or drastically they change."

Maintaining Balance

"This responsiveness should include both a self-adaptive capability and a sensitivity to operator stimuli that enhances the system's facility for maintaining the balance between resources and requirements."

To meet this need and to minimize human intervention in the process, the planners said that "system should dynamically allocate resources and schedule activities against varying workloads so that the installation's throughput, turnaround time and/or response time requirements are satisfied."

Furthermore, there will be automatic error recovery procedures built into the system which would be started automatically and would include system re-configuration, and would have on-line analysis of the parts in the system that failed.

'Q' Must Be Usable For Non-Programmers

(Continued from Page 45)

seventies will manifest both batch and interactive data processing [the two extremes for binding]; thus both extremes are required with degrees of early or lateness in-between so that customers in application development of casual users can select the appropriate option with its flexibility/performance trade-offs," they said.

The requirements of data migration and data interchange must be facilitated on System Q, the planners said, so that users can have their existing application "data transverse from the source system to the target system dynamically," and the portability of the systems and programs should be improved.

In the areas of data integrity and data security, users will require more of their operating systems in the seventies, the planners noted.

They did provisions should be built into Q to help insure the accuracy of data in data bases (so that, for example, two concurrently operating programs using one data base cannot both update it simultaneously).

In addition, data security provisions should provide that "the use of data... be selective by specific programs, terminals, users, operators, etc." at the option of the using installation.

Lastly, the planners said there should be more provisions for data journaling and data recovery in the new system.

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Keeping River Quality High

RICHLAND, Wash. — Basille-Northwest scientists are making a computer model of a 100-mile stretch of the Chehalis River to help local planners predict what new waste sources or water treatment plants would do to water quality.

Security, Privacy Major Parts Of 'Q'; IBM Will Provide 'Tools'

By E. Drake Lundell Jr.
Of the CW Staff

TULSA, Okla. — Privacy and security features will be a major part of System Q if the software designers can meet the functional specifications laid down by the planners who set the requirements for the system.

Noting that "privacy becomes increasingly important as customers capture more data and increase the availability of the data to multiple users," the designers decreed that System Q "should provide the customer the necessary tools for privacy in his data processing installation.

"However," they claimed, "IBM cannot realistically provide generalized 'privacy' in our products, but can assist the user customer in achieving his desired degree of privacy by giving him the tools to accomplish this task."

User Prerogatives

To do this, the entire system "should be constructed with the point of view that data is private to its creator (owner) until and unless he stipulates otherwise, that the users of the system are granted certain prerogatives by the management of the installation beginning with the right to access the facility in the first place, etc.

"The system must be constructed in such a way that its own integrity is assured and any compromises of that system security must be chosen explicitly and overtly by the customer in the interests of achieving some other objective, such as improved performance or operation flexibility."

One of the methods of providing greater security will be multiple-level authorization schemes in the system.

The authorization schemes will include authorizations for fetching, storing, del-

tion, execution and exclusion, the planners said.

"These options would include authorization at log-on, sign-on and at the applications level. The system must enforce its own security in each of its major areas including batch operations. The installation management will be given methods of prohibiting certain users from operating in one or more of the supported modes of operation, such as batch, conversational, remote job entry, remote network, etc.

"Further, the customer shall be able to restrict certain users from accessing certain devices, executing certain programs, and, in general, using the system in other than the way the installation intends."

There will also be ways to insure the integrity of the system built into it, the planners said, but they were not specific on methods of obtaining this.

In addition, there will be an audit function within System Q.

As "an installation option the user should be able to record and analyze all attempted breaches of security to facilitate detection of security problems and alteration of security procedures."

There will also be provisions for network security, the planners said, covering "all" the security aspects of networks.

This type of security becomes increasingly important "when considering multiple-node networks with programs and data being transmitted and perhaps being executed at 'unknown' nodes of the net."

"A simple case is where two enterprises in a related industry who are potential competitors might be executing programs on the same node of a network and the isolation problems that occur for their data and programs. . . Security is a prerequisite to the widespread use of networks in the seventies."

RAS Features Must Be Integrated

TULSA, Okla. — "The reliability, availability and serviceability (RAS) aspects of the system are among the most significant" requirements of System Q, according to the designers of the system.

"The inevitable consequence of a system such as Q is that people come to expect it to be there in a fully operational condition at all times, rather like the telephone or telegraph or television industry equipment," they pointed out.

This is especially true, the planners said, as the system becomes more widely used in such areas as interactive processing and in the sensor-based applications areas such as process control.

"Because of the significance the users will attach to RAS, these features of the system should be fully integrated into the hardware/software package so as to provide predictable levels of availability for a given configuration."

In addition, they told the programmers that "provisions should be made for the graceful degradation of system performance when components fail and for the automatic reconfiguration of the system to isolate and bypass failing components."

Also, the system "should provide for automatic journaling and for the recovery of damaged data bases in the event of major system failure. System restart should be fully automated so that minimal operator action is required. Fully automatic restart, possible with reconfiguration, should be available as a system option with operator-dependent factors (such as date and time of day) maintained externally from the system."

Also, "a system debugging package with local and (at customer option) remote access must be available which permits the customer to properly initiate, identify, log and document problems to his program support customer engineer."

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Users Benefit as Competition Improves A/V Courses

Comparing the newly released sixth edition of the *Guide to Audio/Visual Materials for Data Processing Instruction* to prior editions reveals almost two-thirds of the training firms born by IBM's unbundling no longer exist. Despite the fall-out of firms, however, the scope of courses available continues to widen.

This year's edition of the annual guide shows three independent guides expanding their libraries of products. Advanced Systems Inc. (ASI), Deltak and Edutronics now provide courses on all the major and many of the minor topics in the DP field.

Most courses cover state-of-the-art subjects: all three vendors have released courses on virtual storage. Nevertheless, general-purpose courses such as Fortran, Cobol, system analysis and design are available too.

In addition to the products listed in the new A/V Guide, the chief executive of each firm has revealed courses or product changes which will be released during the next six months.

ASI Converts to Color

ASI has joined the color ranks, making its library available on reel or cassette form. This step is important for users who can now utilize the offerings of all three vendors through one viewing unit.

George Ravazzola, ASI president, reported a cost/benefit analysis course will be available in 90 days. The 4-module course will sell for \$1,200. The entire System Analysis and Design series of 36 modules is being revised and will be released throughout the next year as each module is completed.

ASI is also expanding its applications courses. Although now confined to manufacturing, the series will be enlarged in the fourth quarter to include units on purchasing, inventory control and shop floor control.

ASI's Introduction to IBM S/370: Concepts and Facilities should be released by July 1. The 5-module course will sell in the \$1,000 to \$1,200 range.

The S/370 course on computer operator training will be available in August. This 5-module course will also sell for some where in the \$1,000-\$1,200

range.

Deltak's 80-module VS series will be completed before the year ends. Robert King, Deltak president, has announced availability of the VS1 Operators course (7-module) by mid-June and the VS2 (Release 1) Operators



J. Daniel Couper
Edutronics
Education

course (7-module) by August. The VS Programmer course (25 modules) will be released by module, starting in July.

Ed Musselwhite, executive vice president, reported the ANS Cobol series will be ready in June. Deltak's course is aimed at the entry level programmer.

A new 4-module database course will be ready this month and two DOS courses will be released in the fall. The 12-module operators course should be ready in September and the 15-module programmers course should be ready by January.

A new system analysis and design course will be produced by

Edutronics. The 22-module course will be based on my own book, *System Analysis Techniques* (John Wiley and Sons, Inc.). George Howard, president of Edutronics, has also announced an eight-film course in data communications, produced in cooperation with Eastern Airlines.

State-of-the-art courses in IBM S/370 I/O devices and VS1 and VS2 will be released in the near future. A new 10-module Job Control Language course equips the student with a working knowledge of JCL.

The course is divided into two sections: Elements of JCL and

JCL Coding Techniques, making it possible to run classes in parallel for two levels of students. A pragmatic course, the JCL series gives suggestions for avoiding problems as well as covering proper operating procedures.

The sixth annual guide to A/V materials for data processing contains descriptions of products of 12 firms. The guide may be acquired for \$3 from the University of Colorado, Cragmor Road, Colorado Springs, Colo. 80907.

Couper is professor of computer sciences and management at the University of Colorado.

Wiltek data commu can move all th of typewr a big corporati



The Wiltek difference. The Wiltek terminal combines high speed with the ability to batch data and transmit it automatically over standard dial-up facilities. Two unique 50,000 character storage buffers are built into the Wiltek terminal. One temporarily stores incoming data, the other outgoing data. The buffers enable the terminal to send and receive large amounts of data during a single call - and with no interruption of data entry. Data moves fast, phone calls are brief. Transmission costs go down more than 50%!

The Wiltek Model 300 is the most economical Wiltek keyboard entry terminal, suitable for low to medium volume locations. Like all Wiltek terminals, the Model 300 automatically makes error checks during transmission. At a large oil company which recently installed 300's in its regional field offices, terminal operators used to spend hours each day re-entering garbled messages. Automatic detection and re-transmission has resulted in more efficient operation and considerable cost savings.

The Wiltek Model 400, with its 30 cps KSR, is perfect for high volume locations. Several corporations use the Model 300 (left) at all remote locations and the Model 400 at corporate headquarters. A packaging company uses 400's at a central location to receive reports from offices around the country on the status of shipments in transit.

Course Reviews "CPU-on-a-Chip"

SILVER SPRING, Md. - Designers and others familiar with digital circuitry can get a better understanding of the various "CPU-on-a-chip" computers through a course on microcomputer selection and programming offered by Software Technique Inc.

The course includes a seminar and workshop sessions. The seminar provides an overview, with discussions and comparisons of all the known microcomputers. Each is then individually covered and made available for hands-on experience in a workshop environment.

Presentations at client offices start at \$1,000. This works out to an average cost of about \$75 per student based on expected class sizes, a spokesman said at room 1125, 8811 Colverville Road, 20910.

and save hundreds of dollars in

Mini Monitors Student Progress

UTICA, N.Y. — The Board of Education here has purchased a minicomputer to monitor student progress in reading and mathematics skills in a pilot education program.

The Comprehensive Achievement Monitoring System (CAM) was developed by Dr. Olcott Gardner of the Jamesville-DeWitt Central School, under special state and federal grants.

The New York State CAM project is the pilot project in the action for the installation of this particular educational software on minicomputers, Gardner said.

"The purpose of CAM," Gardner said, "is to accomplish program assessment for a particular course or grade level, to determine where certain objectives are taught, the percent mas-

tery after they are taught and where certain objectives lose retention."

The program breaks year courses into individual Learning Activity Projects (LAPs), enabling each student to progress at his own rate. As each LAP is completed, the computer scores the project, prints out a result sheet for the instructor and stores the information.

"One asset of this program," according to Ronald D. Ayer, Utica administrator for research and development, "is the ability to retrieve grading and statistical output for each individual student at any time."

The school uses a 4K PDP-8, with two magnetic tape decks, card readers, teletypewriter terminal and printer.

X-Ray + DP 'Make No Bones' About Assessing Skeletal Health

By Ken Shonk
or meow start

DAYTON, Ohio — Using an inherited, left-over optical scanner and a Linc-8 computer, neither of which had the exact capabilities needed, a research group at Wright State University here has assembled an automatic system for assessing the health of the skeleton from an X-ray of the hand. The system, which measures bone density, is capable of detecting changes in the amount and kind of bone mineral substance long before visually discernible changes take place, according to Prof. Charles Colbert, director of the project.

"Since we had to make do with what we had, assembling the equipment for the job was one of the real challenges," Colbert explained. "The photodensitometer used to optically scan the X-rays, for instance, was never designed to talk to a computer, and the Linc-8 was never designed to handle the multiprogramming mode we needed to operate in."

Colbert's graduate assistant, Henk Vanhulst, a physics graduate from Antioch College who had no computer experience before the project began, designed a way of swapping parts of the program between the disk and the memory. He also designed the multiprogramming system for the Linc-8, a laboratory-oriented computer from Digital Equipment Corp. which was the predecessor to the PDP-12.

The photodensitometer scans the X-ray of the three middle fingers of the left hand, taking gray level readings for the middle bone of each finger and transmitting the data on-line to the computer.

"The computer, which senses when the beam crosses and leaves the bone image, then uses an algorithm based on the physics of what happens to X-ray photons when they penetrate a body part and expose film, to calculate the radiological weight and the area of the bone (a measure of the size). By simple division the computer then gets the radiological density of the bones.

"The computer compares the measured values for a patient to norms we've established from measurements on a large number of normal men and women of all ages and which depend only on sex and age," Colbert stated. "Once we plug in the patient's sex and age, the computer goes to the appropriate density curve, prints out the patient's measurements, the normal values and range and a comparison as either a percentile ranking or a qualitative ranking."

Comparing the rankings to particular patterns found to be characteristic for certain bone disorders, the computer can also make a partial diagnostic evaluation, Colbert pointed out. "A finding of overweight, overlarge bones together with normal size and skeletal age might indicate lead poisoning. Overweight, oversized and oversized bones combined with normal skeletal age is characteristic of patients with congenital rickets overtreated with Vitamin D," he explained.

Colbert noted that this project has concentrated on making the system a clinically workable tool in both diagnosis and treatment of bone disorders.

Communications terminals in different kinds written data on generates...



The Wiltek Model 350 is used where many copies are required or where almost continuous operation is expected. A chemical company uses 350's at its regional offices where sales orders are entered on four-part forms, and at its plants where the orders print out on eight-part forms.

The Wiltek Model 820 terminal transmits punched card data from remote locations. A major manufacturing corporation has installed Model 820's to transmit payroll data from forty plants to a single computer center for centralized processing. The same system also employs Model 400 terminals at all locations to handle administrative messages.

The Wiltek Model 500 terminal uses an advanced CRT with 2000-character display. The 500's editing features make entry of formatted data fast and easy. A nationwide delivery service using the Model 500 to enter package tracers increased operator output by 50% over the previously used teletypewriters.

Our new booklet shows how Wiltek's terminal concept can make corporate data communications more efficient and less costly. Write Robert Colella, Commercial Marketing Manager, Wiltek, Inc., Glover Avenue, Norwalk, CT 06852.

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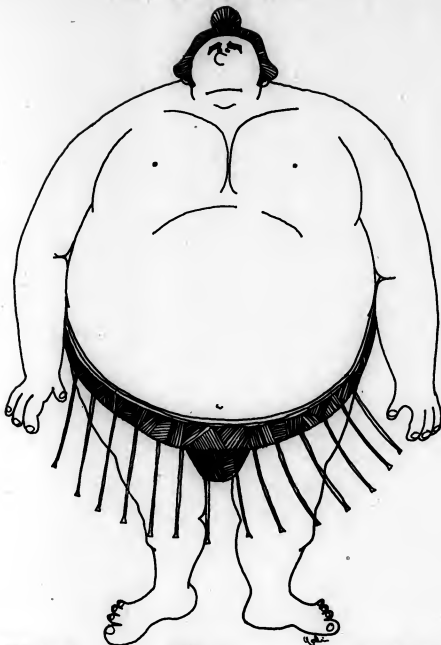
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- Initial circulation is guaranteed at 35,000, divided about 80% to end-users and 20% to the computer industry. Circulation development methods currently under way are the same as those which gave *Computerworld* the highest paid circulation in its field in less than four years.
- Shukan lets you in on the action in the world's fastest growing EDP market. The Japanese Ministry of International Trade and Industry (MITI) has made the following 1978 forecast: 39,000 general-purpose systems installed, up from 11,237 in 1971; 11,000 minicomputers installed, up from 1,670 in 1971; and 3,000 industrial systems installed, up from 1,066 in 1971.
- Is this growth likely? The latest census of general-purpose systems revealed that there were 14,806 systems installed as of September 1972, a one-year gain of 3,569

units and \$911 million installed value, a growth of 31.7% and 23.1%, respectively. And more than 50% of these new systems were American made.

• It is true that there are import restrictions. But Japanese vendors and users can get permission to import almost anything they want and need. As a result, 1972 imports were over \$360 million.

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What the Papers Say

CI Notes

IBM Planning New Data Entry Family

Brokers Order Telegote

TRUMBULL, Conn. — Five national brokerage firms have signed orders totaling more than \$6 million with Bunker Ramo Corp. for its System 7 and Telegote stock quotation services.

The contracts include about 3,400 desk units in 286 main and branch offices of Hombrower & Weeks-Hemphill, Noyes, Inc.; Harris, Upham & Co., Inc.; Shearson, Hamill & Co., Inc.; Thomson & McKinnon Auchincloss Inc.; and Hayden, Stone, Inc.

Similar contracts have already been signed by E.F. Hutton & Co. and Dean Witter & Co.

Under the contracts, the firms have the option to interconnect the Bunker Ramo terminals with their own computers.

Tally, Ball Talk Financing

KENT, Wash. — Cash-hungry Tally Corp. and Ball Corp., maker of glass containers and electronic products, have reached preliminary agreement on an arrangement to provide Tally with financing.

Under the terms of the agreement, Tally would issue to Ball warrants to purchase about 1.6 million shares of common at \$3 a share.

Tally said the agreement is subject to certain conditions, and if completed is expected to provide "adequate funds to meet the requirements of its current programs."

GTE Unit Seeks Logic

WHITE PLAINS, N.Y. — GTE Information Systems, Inc. is negotiating to acquire Logic Corp., a key-disk input system maker.

Any agreement would not exceed \$2 million, in cash or stock, and would be subject to approval by the boards of directors of both companies and by Logic's shareholders.

Logic makes key-disk units in addition to data collection and preparation systems. GTE Information Services markets data communications equipment, software services and systems.

Wescor OKs Floor Sales

SAN FRANCISCO — The Western Electronic Show and Convention (Wescor) has issued a clarifying statement indicating that sales, but not delivery of products, will be permitted to occur on the floor of the show. Previously the permissibility of on-the-floor sales was a grey area.

Supershorts

Data 100 Corp. has shipped its 1,000th Model 70 remote batch terminal, which it started producing in April 1970.

Computer Services Corp. has created a Software Products Division, and said it will soon announce a new product.

TULSA, Okla. — The 3740 will not be IBM's only data entry product, according to minutes of a 1972 IBM management committee meeting revealed in the *Tele-IBM* case.

In fact, the minutes show there was a great deal of opposition to the introduction of the 3740 on the part of the IBM Data Processing Group which wanted to wait until the firm was prepared to offer a new modular series of data entry equipment.

Some Disinfection

The group reportedly opposed the introduction of the 3740, known then as the Viking system, and was "driving for a family of data entry units based on the universal controller in SDD (System Development Division) in order to offer the marketplace several related products as opposed to one-of-a-kind units like Viking even though market entry will be admittedly late."

The group argued that the Viking's projected life of 70 months did not take into consideration the new family of systems under development.

Because of this, the group found the Viking program to be one of high risk and one that did not offer "any promise of sustained leadership in the data entry marketplace."

More Intelligence

The group downgraded the Viking system because it felt the data entry marketplace had a very definite requirement for intelligence in the system, "particularly with the principal competition of the clustered key entry systems," the minutes show.

The group had killed the Viking project in late 1971, but World Trade Corp. took the matter to the management committee for resolution.

Both the corporate marketing people and the management committee agreed with World Trade and ordered the program reinstated, the minutes show.

At that time, early in 1972, the company had already invested \$7 million in the Viking program and expected to invest another \$7 million before the product was released to the market.

However, the profit projections for the system were not up to the usual high levels expected at IBM, the figures show. Based on a 70-month life, the unit would produce a profit of only 11.6% worldwide, with the U.S. profit pegged at 13.7% and the World Trade profit at 9.3%.

The New Family

The new family of systems that will replace the Viking program will be completely modular.

"The plan called for a family of products using standard technologies as basic building blocks in the keyboard, display,

control unit and printer areas which will permit both key entry products and customized industry terminals to be developed with maximum commonality and attendant benefits," the management committee was told.

The committee recommended that the work continue on this family of systems in the Systems Development Division during the 1972-73 budgetary period, noting that the "benefits to be derived from different approaches... could well justify the duplicate expenditure involved."

Although no target dates for the announcement of the new systems are mentioned in the minutes, it is clear that IBM does have a product that is at least near

to the market stage that will compete with clustered data entry stations made by several independents.

The decision to announce the product will apparently be a marketing one, since IBM will have to carefully consider the impact of the new system on the already announced 3740.

The strategy that will be followed probably will be to delay the announcement as long as possible if it appears that the Viking program will meet its goals.

However, if the Viking program is seen to be falling short of those projections, then the firm might rush its new family of data entry systems to the market faster than it would have otherwise.

Dropping of Midas System Hints At IBM's Disk Drive Strategy

By E. Drake Lundell Jr.

Of the CW Staff

TULSA, Okla. — Apparently the Midas disk drive program at IBM did not have the golden touch of its namesake.

Primarily for marketing reasons, IBM has "terminated" the project to market an approximately half-density 3330, and the cancellation of the Midas program may give a significant glimpse at IBM's future disk drive strategy.

The Midas system was part of an overall IBM program to enhance the 3330 during its projected lifetime, apparently to keep independent producers and users off balance.

Midas itself was to have a maximum capacity of 60M byte/disk as compared to the 3330's 10M byte/disk and was to have had eight of the 3330's read/write heads removed for its operation.

However, the IBM marketing department discovered that the Winchester drive, announced as the 3420, would have a 30% to 35% price advantage over a Midas system with four to five spindles. Therefore Midas was dropped even though the project had been fully developed at the firm's San Jose disk development facility.

It is clear from some documents that IBM wants to press its Winchester technology now while it has little competition in enclosing all of the read/write heads in the disk pack rather than the disk drive.

Presently the firm has a clear edge in this area, and it is known that the independents will probably have a hard time finding disk pack suppliers capable of integrating the heads into their packs, which will force them to develop the packs themselves.

This could be an expensive and unwarranted process for the smaller firms in the business, and in fact could force several of them to the wall if indeed IBM

is successful in making Winchester and its follow-ons the standards for the industry.

With their development dollars tied up in the 3330 area and with a large inventory of 3330-like devices the independents will be hard-pressed if IBM cuts off its 3330 enhancement program as it appears to be doing.

The independents would have been able to fight further 3330 enhancements because it is a technology they are familiar with, and they have an inventory of 3330-like devices that could have been reworked into machines of the Midas or Iceberg type.

It is not yet clear whether the Iceberg program — essentially a double-density 3330 — is still in the IBM game plan.

Analysis

However, it is clear that one of the problems from the IBM viewpoint — with both the Iceberg and Midas programs — is the systems could be readily duplicated by the independent peripherals industry that has now gained experience with the 3330-equivalent disk drives.

All of the recently released secret IBM documents show the firm is conscious of the competition and is constantly urging its engineering departments to come up with ideas that cannot be easily duplicated by the independents, therefore keeping the independents off balance and their markets relatively small.

The independents who hope to survive if IBM is successful in downplaying 3330s in favor of the Winchester concept will have to start working on the new devices now or convince computer users that their planned 3330-like enhancements are reasonable alternatives to the Winchester-type drives.



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NCR Sees More Internal Changes On Road to Systems Capability

By Marvin Smalheiser
CW West Coast Bureau

SAN DIEGO, Calif. — National Cash Register Co. (NCR) has successfully come through an important period of change and more change is in the offing to make it stronger and more profitable, according to William S. Anderson, NCR president.

Anderson told a recent news meeting that most of the necessary transition had been accomplished by NCR but more change is due in both organization, including marketing and support groups, and products.

He said NCR is pointed in the direction of building systems capability.

"In the future, it will be systems capability, orientation toward the customer's needs and new directions in support and services which will be decisive in the marketplace."

Anderson said despite a loss in 1972, NCR was in the black with record revenues in the first quarter of this year.

"We were able to report that incoming equipment orders for the first three

399 series, plus release of more data terminals and associated communications equipment, he said.

Software a Sore Spot

Anderson expressed some dissatisfaction with NCR's software effort despite an investment of "over \$25 million in Century software during the past three years alone."

He told of a new General and Applications Software Development Division, which he personally will monitor.

In the near future, he said, a number of important new packages will be announced.

Anderson, who took over the helm at NCR a year ago, said "virtually every aspect of NCR's operations" has been reshaped and reorganized.

But he added: "In the future I shall be announcing a similar reorganization of our marketing and support groups."

Orders & Installations

Industrial National Bank of Rhode Island has purchased a Financial Information and Control System from Management Science America, to automate financial reporting.

Pan American World Airways has ordered a communications system from Collins Radio Co. as part of its worldwide reservation system. The order includes dual C-8500 communications processors and program switching equipment.

The New York General Post Office has purchased an Advanced Optical Character Reader (AOCR) system from Recognition Equipment Inc. for use in postal letter-sorting applications.

Temple University has ordered a Student Scheduling System from Systems and Computer Technology Corp. to provide computer support during the pre-registration, final registration and scheduling process.

Hecht Co., a department store firm, has ordered an additional 290 NCR 280 ter-

minals and an NCR 725 in-store computer, to convert its stores to point-of-sale equipment.

The Commonwealth of Virginia has ordered a Quik-Draft system from Aspen Systems Corp. for legislative bill drafting.

The system uses CRT terminals on-line to a computer for text editing.

The State of Wisconsin's Internal Revenue Department has ordered an LC-720 key-to-disk system from Logic Corp.

Old Stone Bank of Warwick, R.I., has installed a second NCR Century 200 to monitor demand deposits, savings accounts and installment mortgage loans.

Wells Fargo Bank, San Francisco, has ordered a Trace check processing system from Recognition Equipment. The bank will use this system for positive item control and high-density microfilming in its check-processing operations.

Dow Chemical has purchased a Micro-Sum computer performance measurement system from Tsdatsa.

'...a Sense of Unity'

SAN DIEGO, Calif. — For William Anderson, the most important accomplishment of his first year as president of NCR is creating a "sense of unity in the company... a sense of dedication to be in the computer business."

In the past, "we felt maybe we were, maybe we were not... but if we're not in the computer business we're out of business, period."

The major obstacle now, he said, is assuring profitability.

"Now that we have tightened our belt, we have to make more money."

Months of this year were up 22% over the comparable period of last year," Anderson said.

He noted the increase was paced by the DP business. When all computer-related equipment and services are taken into account, he said, NCR is profitable in computers.

Regarding NCR and Control Data Corp., its partner in a joint venture, Anderson said: "We are also making encouraging progress toward achieving compatibility between future NCR systems and future CDC systems so that both partners can offer a full range of computing power."

NCR's development of the next generation of Century computers is on schedule, he said, but declined to disclose any features.

There will be further expansion of the new family of satellite computers, the

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CPI Plans to Deliver \$100 Million in '73

EDINA, Minn. — The year-old Computer Peripherals, Inc., a joint venture of Control Data Corp. and NCR, expects to deliver over \$100 million worth of products to the parent firms during 1973, according to President Paul J. Bulver.

The firm was established to engineer and manufacture printers, tape drives and punched-card equipment for use with both CDC and NCR systems.

"Already both CDC and NCR have achieved significant savings in the form of lower-cost computer peripherals and in shared research and development costs," Bulver noted.

CPI's product line includes a 1,200 line/min train printer and 150-, 300- and 600 line/min drum printers.

In the tape line, CPI produces single and dual-capstan tape transports. CPI also makes a high-speed card reader, a high-speed punch and a medium-speed reader/punch.

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Japan Market Share Falling

Liberalization Move Seen as Mixed Blessing for IBM

By Molly Upton
Of the CW Staff

TOKYO—The proposed liberalization policy permitting up to 100% of foreign capital investment of computer firms here [CW, May 30] could have several effects on the DP race, according to *EDP Japan Report*, a publication of International Consulting Corp.

While largely benefitting several U.S. makers who now fall under the classification of foreign firms, the results would be mixed for IBM, which has the distinction of being a wholly owned subsidiary of a foreign company allowed to engage in production in Japan, the report said.

Plus for IBM

IBM will benefit since it will be freed from the controls of the Ministry of International Trade and Industry (MITI), which has limited the production of the 360 Series to two models, the 20 and the 40, and classified the 370 Series as prod-

ucts of a "foreign-capital enterprise" although manufactured in Japan (thus excluding IBM from the large government-controlled market).

On the negative side for IBM, however, the other U.S. makers are expected to escalate their Japanese sales efforts and to begin production in Japan, so IBM will "lose its biggest advantage, domestic production, which has so far been its exclusive privilege," the newsletter noted.

MITI is currently studying how to protect the domestic industry after the liberalization, and plans to take the following measures, according to *EDP Japan Report*:

- Readjustment of conditions and procedures for invoking emergency tariffs and dumping duties and a reexamination of the tariff system.
- Establishment of a "tariff investigator system" to guard against foreign firms "dumping" computers in Japan.
- Revision or enactment of a new

antimonopoly law in order to keep IBM Japan's market share within a reasonable percentage, "even if the firm should take no unusual measures to attain monopoly."

IBM's Share Falling

Although IBM may have been the first and is now the largest foreign DP enterprise in Japan, its market share has been falling in the last five years, according to the newsletter.

IBM has the giant size of the Japanese market pie, 30%, but its share in the Japanese market is the smallest of its shares in major countries of the world, the newsletter said.

Its sales have also tended to level off as market share declined.

Government regulation is cited as being largely responsible for the decline from about 34% in 1968.

System 370 is not recognized as a Japanese-made computer, as IBM-Japan is

more than 50% owned by foreign interests.

This precludes IBM products from being handled by Japan Electronic Computer Co., a joint rental firm formed by Japanese manufacturers.

Home Sweet Home

Additionally, domestic companies enjoy various financing and tax benefits under MITI's policy of promoting the domestic industry, the newsletter pointed out.

IBM-Japan is currently excluded from the government and related organizations market, whose installed base at the end of September 1972 was valued at \$516 million.

The firm must export 50% of its products.

MITI also excluded IBM-Japan from producing the Model 30 in Japan, while levying 15% tariff on imported mainframes and 25% on peripheral terminal equipment. In April 1972, the rates were lowered to 13.5% and 22.5% respectively. IBM-Japan must obtain prior authorization from MITI to sell products in Japan made by any of the affiliates of IBM-World Trade in other countries.

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SYCOR

See the Sycor 250 at the National Computer Conference. We'll be in booth 2001.

Contracts

Quotron Systems, Inc., Los Angeles, has received a \$4.4 million contract from Dun & Bradstreet, Inc. for its Model 801 communications equipment to be used as part of Dun & Bradstreet's Advanced Office System.

Dacomics has received a contract valued at over \$1 million from the Department of Commerce for 59 additional mini-computer systems for use at National Weather Service stations.

CAE Electronics Ltd. of St. Laurent, Que., has been awarded a contract by Canatone Non-Max, valued at more than \$400,000, to provide the DP system for the heavy water plant at Glace Bay, Nova Scotia.

Logicon, Inc. is developing a preliminary software design for an advanced ballistic missile reentry system under a \$643,000 contract from the Air Force Space and Missile Systems Organization in Los Angeles.

Pulaski Savings and Loan Association and Quincy-Peoples Savings and Loan Association have contracted for on-line savings and mortgage accounting services from Financial Data Systems, Inc.'s St. Louis data center.

Keane Associates, Inc. has received a contract worth over \$300,000 from Northeast Utilities, Inc. of Berlin, Conn., for development of a computer-based financial and accounting system.

Digi-Log Systems, Inc. has received a \$48,000 contract from Xonics, Inc. of Van Nuys, Calif., for 20 custom-designed terminals.

Informatics, Inc. Western Division has been awarded a \$133,000 software contract for data acquisition and recording at NASA's wind tunnel test facilities at Ames Research Center.

The Naval Electronics Laboratory Center in San Diego has awarded Control Data's Professional Services Division a contract valued at \$281,000 for systems engineering and documentation services.

Computer Corp. of America, Cambridge, Mass., has received a contract from the Department of Defense for its Model 204 on-line data base management software system.

Computer Sciences Corp. has received a \$1.2 million Navy contract to develop programs for a tactical support center aboard aircraft carriers.

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Potter to License Patent On Group Coded Recording

PLAINVIEW, N.Y. — Independents may have an opportunity to manufacture 6,250 bit/in. tape drives using group coded recording, the same technology IBM uses in its 3420 Models 4, 6 and 8, through a licensing agreement offer from Potter Instrument Co.

While IBM would not confirm that it uses patent No. 3,226,685 in the manufacture of these units, it did say that patent was one of a number of patents licensed to IBM by Potter in 1971. IBM paid a fixed price of about \$3.7 million for the patents, according to George W. May, president of Potter.

The patent was issued in the name of John T. Potter, in 1965.

'Of No Concern'

IBM said: "The coverage of Potter's patent No. 3,226,685 has not been determined by IBM and is of no concern since we are licensed on a fully paid-up basis."

May explained that Potter "was anxious to have them

[IBM] use some of our patents. Then it becomes some sort of standard. If we said no to them they might have figured out another way of doing it."

"Obviously, some patents are more valuable than others. And they paid us a substantial fee, so we felt there was one in there that they really wanted, and we know which one it was."

Use Not Foreseen

But May admitted "it was only when they introduced the 6,250 [bit/in.] system that we realized that one of the patents we licensed them could be used to develop such a system."

"The more we looked at it the more we realized that in our opinion they did use this technique covered by this particular patent," he said.

Agreements with other firms would be negotiated, and might involve arrangements such as Potter manufacturing and selling on an OEM basis key parts of the tape drives or a straight development effort, May said.

Wema Files Software Tax Motion

SACRAMENTO, Calif. — The Western Electric Manufacturers Association (Wema) has stepped up its participation in the California battle over taxation of software.

The group has proposed an amendment that would narrow the definition of taxable software and has established full-time representation in Sacramento to lobby for its amendment.

California bill AB 69, introduced by Assemblyman Joseph Gonsalves, seeks to extend permanently the two-year moratorium on taxation of all software except "basic operational programs."

This bill leaves the definition

of that phrase up to the Board of Equalization, which Wema claims has applied too broad an interpretation.

The Wema amendment to AB 69 defines basic operational programs as only those programs that are "fundamental and necessary to the function of a computer."

This definition, Wema said, would exclude such programs as language translators, service programs and applications programs from the definitions issued earlier by the state Board of Equalization.

Cutbacks Affect EXORX's Unit

NEW YORK — Low volume of securities trading has caused a cutback in the personnel and a delay in projects at the Securities Industry Automation Corp. (Siac), the computer subsidiary jointly operated by the American Stock Exchange and the New York Stock Exchange.

Siac performs DP work for the two exchanges, and much of its business is related to trading volume.

A total of 61 persons, or about 6% of the staff, have received notices during May.

The latest round of cuts involves managerial and professional people, according to a spokesman, whereas the first layoffs were mainly technical personnel.

In addition to the layoffs, the program to expand computerized execution of odd-lot orders is expected to be delayed.

In the first quarter, Siac spent \$1.3 million more than it received. Revenues stem from such items as charges for the exchanges' stock-ticker services.

Singer Forms Support Unit

NEW YORK — Singer Business Machines has formed a new marketing support organization to consolidate all functions related to the sale, installation, maintenance and software support of its products.

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Sales Off to End Users

STC Earnings, Revenues Rise in Quarter

LOUISVILLE, Colo. — Earnings and revenues were on the rise during the first quarter at Storage Technology Corp. despite the slackened pace of sales to end users compared with the previous two quarters.

In the period ended March 30, earnings rose to \$1.7 million or 49 cents a share, including a \$645,000 special credit, compared with \$207,000 or 7 cents a share, including a \$98,000 special credit, in the comparable 1972 period.

Revenues rose to \$11.3 million from \$3.7 million in the same year-ago period. Of this amount, \$7.9 million was obtained from sales and \$3.4 million from

rental and service income.

As of April 30, annual revenue from rental and service fees had increased to \$15.2 million from \$6.2 million a year earlier, the firm said.

Profitability, a spokesman noted, continues to remain heavily dependent upon the sale of equipment to end users, distributors and leasing companies.

End-user sales were below those of the past two quarters which the firm attributed to the "adverse effects of a rumored announcement by IBM of a new line of high-density tape equipment." After IBM and STC announced their products, "orders and shipments increased significantly," the spokesman said.

cantly," the spokesman said.

Of the \$7.9 million revenues from sales, \$7.5 million represented sales to leasing companies.

Nickels & Dimes

Although Xerox expects 1973 profits to match its 17% increase in 1972 earnings, President Archie R. McCardell told shareholders the cost of introducing new products would make it difficult for the second half of 1973 to equal the "excellent financial results" expected for the first half.

Xerox directors voted an increase in the quarterly dividend to 22 cents a share from 21 cents payable July 2 to holders of record June 8.

\$\$\$

Adverse market conditions: Advanced Memory Systems has withdrawn its registration statement for 150,000 shares by the company and 313,500 shares by stockholders. Signetics has postponed its public offering of 715,000 shares of common.

\$\$\$

Electronic Computer Programming Institute's annual meeting has been postponed because of negotiations through which the chairman and vice-chairman of the board might transfer control of the company through sale of their stock.

\$\$\$

Tri-Data's profitability in 1972 was attributed largely to the "increasing acceptance" of new models of Cartrifile digital cartridge systems. The firm has procured a new \$500,000 unsecured line of credit from Union Bank of Palo Alto.

\$\$\$

Hewlett-Packard Earnings Rise 70% On 40% Increase in 2d Quarter Sales

PALO ALTO, Calif. — Hewlett-Packard Co. reported a 40% increase in sales and a 70% increase in earnings for the second quarter ended April 30.

Revenues for the quarter totaled \$163 million compared with \$116.6 million for the corresponding 1972 quarter.

Earnings amounted to \$14.6 million or 54 cents a share compared with earnings of \$8.6 million or 33 cents a share in the year-ago period.

Intl Posts Turnaround In First Quarter

SAN FRANCISCO — Intl Corp. posted a turnaround in its first quarter report for the period ended March 31.

Earnings, including a \$254,000 tax credit, totaled \$721,000 or 10 cents a share compared with a loss of \$1.5 million or 21 cents a share in the year-ago period.

Revenues rose to \$33.3 million from \$19.4 million.

Income orders for the quarter rose 37% to \$175.4 million compared with \$127.9 million in the same period of 1972.

For the six months, orders totaled \$331.5 million up 39% from a year ago.

Revenues for the six months amounted to \$290.6 million, a 36% increase over the first half of 1972.

Earnings rose 53% to \$23.3 million or 87 cents a share compared with \$15.2 million or 58 cents a share, during last year's first half.

Virtually all of HP's operating divisions are reporting a higher level of business in 1973, President David Packard said.

"International markets have been particularly strong," he noted, "with orders from international customers amounting to \$139.2 million for the six-month period."

"This represents a gain of 46% over the corresponding period of 1972."

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		1973 RANGE	CLOSE MAY 31	WEEK HIGH	WEEK LOW	NET CHG	PCT CHG
SOFTWARE & EDP SERVICES							
A	ADVANCED COMP TECH	1-2	1	1	1	-11.1	
A	APPLIED DATA TECH	2-4	2 1/4	1 1/4	1 1/4	-12.5	
A	APPLIED LOGIC	3-4	3 1/8	1 1/8	1 1/8	-8.3	
A	AUTOMATIC DATA PRDCT	54-6	54	54	54	-10	
O	BRANDON APPLIED SYST	1-1	5/8	0	0	0.0	
O	COMPUTER ONSHIMSINS	2-3	5/8	1/4	0	-7.1	
O	COMPUTER DYNAMICS	1-2	5/8	0	0	0.0	
O	COMPUTER NETWORK	1-5	1 1/2	1/4	1/4	-20.0	
O	COMPUTER SCIENCES	2-6	2 5/8	1/8	1/8	-5.0	
O	COMPUTER TASK GROUP	1-2	1 1/2	0	0	0.0	
O	COMPUTER TECHNOLOGY	1-3	1 1/2	0	0	0.0	
O	COMPUTER USER	4-9	4 5/8	1/4	1/4	-5.7	
O	COMRESS	1-2	1/8	0	0	0.0	
O	COMSHARE	4-9	4 3/4	1/4	1/4	-5.5	
N	COMBURA CORP	6-15	5 7/8	5/8	5/8	-8.6	
O	ELECTAT	2-4	1 3/4	1/4	1/4	-12.5	
N	EDP RESOURCES	1-3	1 1/2	1/8	1/8	-12.5	
N	EDP COMP PROG	1-2	1 1/2	1/8	1/8	-12.5	
N	EDP ECON DATA SYS	35-6	35 3/4	3/4	3/4	-4.3	
O	EDP INFORMATICS	2-6	3	1/8	1/8	-4.3	
O	1-0-A. DATA CORP	1-1	5/8	1/8	1/8	-16.6	
O	KEANE ASSOCIATES	3-4	3	0	0	0.0	
O	REYNOLDS CORP	2-2	22 5/8	1/8	1/8	0.0	
O	LOGICON	4-7	4	0	0	0.0	
A	MANAGEMENT DATA	2-5	5 1/4	0	0	0.0	
O	NATIONAL CSS INC	8-11	10	-5	1/4	-0.0	
O	NATIONAL INFO SVCS	1-2	1	0	0	0.0	
P	ON LINE SYSTEMS INC	13-17	17 1/2	0	0	0.0	
N	PLANNING RESEARCH	3-7	2 5/8	1/8	1/8	-5.0	
N	PROGRAMMING METHODS	22-24	22 3/4	0	0	0.0	
O	PROGRAMMING & SYS	1-1	7/8	0	0	0.0	
A	RAPIDATA INC	8-11	9	-2	1	-0.0	
O	SCIENTIFIC COMPUTERS	1-2	1	0	0	0.0	
O	SIMPLICITY COMPUTER	2-4	2 3/4	0	0	0.0	
O	TSS COMPUTER CENTERS	2-4	2 3/4	0	0	0.0	
O	TCC INC	1-1	3/8	0	0	0.0	
O	TYNSHARE	6-12	7	-1	16.6		
O	UNITED DATA CENTER	5-6	6	0	0	0.0	
N	UNIVERSITY COMPUTING	5-11	5 1/8	0	0	0.0	
A	URS SYSTEMS	4-8	4	0	0	0.0	

PERIPHERALS & SUBSYSTEMS

N	ADDRESSOGRAPH-NULT	14-34	34	13 1/2	-1 1/2	-3.5	
O	ADVANCED MEMORY SYS	6-23	6	-2	-25.0		
N	AMPEX CORP	4-7	7	1/8	1/8	-3.0	
O	ANDERSON JACOBSON	3-6	3 1/4	1/4	1/4	-8.3	
O	BETHVIE MEDICAL ELEC	6-10	7	1/2	1/2	-7.8	
N	BOLT-BERANEK & NEA	7-12	6	5/8	5/8	-1.0	
N	BUNKER-RAND	6-10	10	7/8	7/8	-9.5	
A	CALCOMP	5-13	7 1/4	1/4	1/4	-1.7	
O	CAMPBELL HEADLES	10-15	15	3/4	3/4	-1.0	
O	CENTRONICS DATA CORP	13-28	28	3/4	3/4	-3.0	
O	CODER CORP	10-19	19 1/2	1/2	1/2	-4.5	
O	COMBISTRONICS	1-1	1	3/8	3/8	-1.6	
O	COMPUTER CONCEPT	1-1	1 3/4	1/4	1/4	-15.3	
A	COMPUTER EQUIPMENT	2-3	2 3/4	1/8	1/8	-5.2	
O	COMPUTER MACHINERY	7-13	6 3/4	0	0	0.0	
O	COMPUTER TRANSFER	8-10	10	3/4	3/4	-21.1	
A	COMPUSET	8-9	9	0	0	0.0	
N	COMTRAC CORP	15-32	32 1/8	3/8	3/8	-5.6	
A	DATA PRODUCTS CORP	2-4	2 7/8	0	0	-27.7	
O	DATA RECOGNITION	2-3	2 1/2	0	0	-1.2	
O	DATA TECHNOLOGY	2-4	2 5/8	1/4	1/4	-10.5	
O	DIAM CONTROLS	2-4	2 1/8	1/4	1/4	-5.5	
N	ELECTRONIC M & N	3-6	3 3/8	1/4	1/4	-4.1	
O	FARBIT-TEK	3-5	2 7/8	3/4	3/4	-15.5	
N	GENERAL COMPUTER SYS	6-9	9 1/4	3/4	3/4	-13.6	
N	HEWLETT ELECTRIC	56-76	75 1/2	0	0	0.0	
N	HATELINC CORP	9-13	9	1/8	0	-0.0	
O	INFOMEX INC	9-23	6 3/4	-2	-18.6		
O	INFORMATION DISPLAYS	1-2	2 3/4	1/8	1/8	-20.0	
O	INFORMATION INTL INC	10-15	15 1/4	1/4	1/4	-2.5	
A	LUNNEY ELECTRONICS	4-9	4 1/8	3/8	3/8	-10.0	
O	MANAGEMENT ASSIST	1-1	1	1/4	0	0.0	
A	NILO ELECTRONICS	15-20	15 1/4	-2 1/4	-12.8		
N	NORMAN DATA SCI	4-13	4 7/8	3/8	3/8	-15.0	
O	ODEC COMPUTER SYST	2-6	2 1/4	1/4	1/4	-12.5	
O	OPTICAL SCANNING	2-7	3	1/4	1/4	-9.0	
O	PERTEC CORP	3-8	5 5/8	1/8	1/8	-2.2	
O	PHOTON	3-7	3 3/4	0	0	0.0	
A	POTTER INSTRUMENT	4-9	9	3/8	3/8	-1.4	
O	PRECISION INST.	4-9	2 1/2	1/4	1/4	-11.1	
O	RECOGNITION EQUIP	4-8	4	5/8	5/8	-13.5	
N	SANDERS ASSOCIATES	7-16	6	1/4	1/4	-3.0	
O	SCAN DATA	2-6	1 3/4	0	0	0.0	
O	STORAGE TECHNOLOGY	12-24	24	12 1/4	-2	-14.0	
A	SYCOR INC	9-12	12	1/4	1/4	-2.0	
O	TALLY CORP	2-14	14 5/8	7/8	7/8	-13.1	
N	TEKTRONIX INC	31-53	53 1/2	1/4	1/4	-2.3	
N	TELEX	3-6	3	0	0	0.0	
O	WILTEX INC	10-16	16	-1	-0.0		

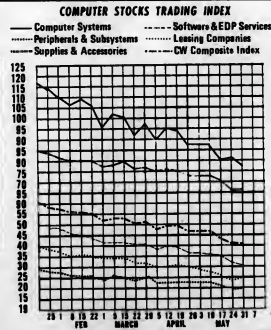
SUPPLIES & ACCESSORIES							
O	BALTIMORE BUS FOUND	5-9	9	6 1/2	0	-6.0	
O	BALTIMORE INST	10-12	12	3 3/4	1/4	-1.0	
A	DATA DOCUMENTS	10-22	16	3/8	-1 1/4	-13.3	
O	DUPLEX PRODUCTS INC	4-18	7 1/2	0	0	0.0	
A	EMVIS INC	9-9	9	3/8	3/8	-7.5	
O	SHANAN MAGNETICS	10-20	10 1/4	0	0	0.0	
O	SHANAN CONTROLS	10-20	20	1/4	1/4	-1.0	

SUPPLIES & ACCESSORIES

		1973 RANGE	CLOSE MAY 31	WEEK HIGH	WEEK LOW	NET CHG	PCT CHG
SUPPLIES & ACCESSORIES							
O	BALTIMORE BUS FORMS	5-9	6 1/2	0	0	0.0	
O	DATA DOCUMENTS	10-22	22 1/8	3/8	3/8	-1.3	
O	DUPLEX PRODUCTS INC	8-18	18 1/2	3/4	3/4	-1.3	
O	EMULS BUS FORMS	10-21	21 1/2	3/4	3/4	-1.3	
O	GRAPHIC CONTROLS	9-12	12 3/4	0	0	0.0	

		1973 RANGE	CLOSE MAY 31	WEEK HIGH	WEEK LOW	NET CHG	PCT CHG
COMPUTER STOCKS TRADING INDEX							
C	3M COMPANY	78-89	82 3/4	-2	1/2	-2.8	
C	MOORE CORP LTD	53-60	54 1/4	-1	1/4	-0.4	
C	IBM	42-58	54 1/4	-1	1/4	-0.4	
C	ODOLPHS & REYNOLD	40-51	44	-1	1/4	-2.3	
C	STANDARD REGISTER	14-20	15 1/2	0	0	0.0	
C	TAN PRODUCTS CO	10-23	11 1/2	-2	1/2	-21.0	
N	UNAC	17-23	18 1/4	7/8	5/8	-0.5	
A	WABASH MAGNETICS	5-7	5 1/2	-1	1/2	-10.0	
N	WALLACE BUS FORMS	19-26	26 1/8	-1/8	1/8	-0.6	
COMPUTER SERVICES							
N	HURROBROOK CORP	211-245	221 3/8	-6	5/8	-2.9	
N	COLLINS HADIS	18-26	26 1/4	-1	3/8	-1.9	
N	CONTROL DATA CORP	30-62	36	1/4	1/4	-11.9	
O	DATA GENERAL CORP	29-31	30 3/4	-1	1/4	-12.8	
O	DIGITAL CORP CONTROL	2-6	6 3/8	1/8	1/8	-5.5	
N	DIGITAL EQUIPMENT	73-105	104 1/8	-1	3/4	-1.6	
N	ELECTRONIC ASSOC.	4-9	5 1/8	3/8	3/8	-7.8	
A	ELECTRONIC ENGINEER	6-11	6 1/4	0	0	0.0	
N	FOXBORO	23-32	34	-1	1/2	-11.1	
O	GENERAL AUTOMATION	26-55	29 1/4	-2	1/4	-7.1	
O	GRI COMPUTER CORP	1-3	1	0	0	0.0	
O	HEATH & LEACH CO	1-2	2 1/4	1/4	1/4	-1.0	
N	HONEYWELL INC	101-139	133	1/8	1/8	-0.1	
N	IBM	315-457	314 3/4	-8	3/4	-2.5	
O	INTERDATA INC	7-13	8 1/4	-1	5/8	-16.4	
N	MEMEC	2-19	2	1/2	1/2	-11.1	
O	MICRODATA CORP	2-3	3 1/2	-1	1/8	-3.7	
O	MINI-DATA	27-35	33 3/8	-1	1/8	-2.0	
N	RAYTHEON CO	24-34	26 1/4	-1	1/8	-4.1	
N	SPERRY RAND	30-50	38 7/8	-1	5/8	-4.0	
A	SYSTEMS ENG. LABS	3-6	3	0	0	0.0	
N	VARIAN ASSOCIATES	18-20	12	1/2	1/2	-4.3	
N	WANG LABS.	14-34	34 1/8	-1	5/8	-0.8	
N	XEROX CORP	141-169	167 5/8	-5	7/8	-3.8	
LEASING COMPANIES							
A	BOOTHIE COMPUTER	1-5	5 1/8	0	0	0.0	
O	BUSHNAGAN INC	1-2	2 1/8	0	0	0.0	
N	MEADCO INC	8-17	7 1/2	-1	1/4	-5.0	
O	CONNECTION GROUP CORP	3-4	4 1/4	-1	3/8	-8.0	
O	COMPUTER EXCHANGE	1-2	2 1/2	0	0	0.0	
A	COMPUTER INVSYS GRP	2-8	3	1/4	1/4	-9.0	
O	COMP. INSTALLATIONS	1-2	1 1/8	1/8	1/8	-12.5	
N	OPF INC	5-9	5 5/8	1/4	1/4	-4.6	
N	METRONIC MENTAL	1-2	2 1/4	0	0	0.0	
A	OEL INC	3-3	3 1/2	-1	1/8	-7.6	
A	OSBORNE-STOH	14-26	25	-1	1/4	-4.0	
A	OPAL INC.	2-6	5 1/4	0	0	0.0	
A	GRANITE MNT	2-6	2 5/8	-1	1/4	-8.0	
A	ROCKWOOD COMPUTER	2-6	2 1/4	-1	1/4	-8.0	
O	SYSTEMS CAPITAL	4-15	6 1/4	-1	1/4	-12.0	
N	U.S. LEASING	10-36	36 1/2	1 3/4	1 3/4	-11.1	

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Earnings Reports

CAMBRIDGE MEMORIES		1973	1972
Shr Erid	8.11	8.08	
Revenue	2,749,746	972,183	
Tax Cred	7,880	38,327	
Earnings	14,078	76,833	
6 Mo Shr	20	0	
Earnings	4,668	1,831	
Tax Cred	0	22,871	
Earnings	256,488	47,657	

COMPUTER EQUIPMENT		1973	1972
Shr Erid	8.09	8.08	
Revenue	6,363,500	5,028,000	
Spec Crd	50,000	47,000	
Earnings	213,000	186,000	

COMPUTER SCIENCES		1973	1972
Year Ended March		(000)	(000)
Shr Erid	8.03	8.02	
Revenue	120,500	80,107	
Spec Crd	48,100	35,747	
Earnings	28,7	25,163	
6 Mo Shr	18	18	
Earnings	2,44	19,238	
Spec Crd	68,100	30,238	
Earnings	2,44	19,238	

Excludes revenue of subsidiaries sold Feb. 24, 1973. Includes 97.2 million shares of common stock interest in Computer Sciences, Inc. Ex-From sale of a subsidiary.

COMPU-DYNE			
Three Months Ended March 31			
	1973	1972	
Shr Erid	8.03	8.0	
Revenue	6,264,428	5,897,22	
Tax Cred	60,00	
Earnings	141,561	123,50	
Mo Shr	.08	.0	
Revenue	13,503,062	11,406,47	
Tax Cred	68,000	122,50	
	700,035	355,0	

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